

B. Sc.

GEYSER.

LETTERS
ON
ICELAND:
CONTAINING
OBSERVATIONS
ON THE
Natural Hiſtory of the Country, Antiquities, Manners and Cuſtoms of the Inhabitants, &c. &c.

MADE,
During a Voyage undertaken in the Year 1772,
By SIR JOSEPH BANKS, P.R.S.
ASSISTED BY
Dr. SOLANDER, F.R.S. Dr. J. LIND, F.R.S.
And ſeveral other Literary and Ingenious GENTLEMEN.

WRITTEN
By UNO VON TROIL, D.D.
Chaplain to his Swediſh Majeſty, &c. &c.

WITH
NOTES and ADDITIONS by the TRANSLATOR.

The Whole reviſed and corrected by
E. MENDES DA COSTA.

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INTRO-

INTRODUCTION.

THE accounts of Iceland, which have hitherto made their appearance in the Engliſh language, are of ſuch a nature, that it would betray ignorance or partiality to recommend them to the public as ſatisfactory and faithful.

The firſt writer of any known hiſtory of Iceland in the preſent century was John Anderſon, afterwards Burgomaſter of Hamburgh, who undertook a voyage to this not much-frequented iſland in a Greenland ſhip; but the authenticity of his performance is far from being ſuch as may be relied on with confidence.

Niels Horrebow, a Daniſh aſtronomer, was ſent to Iceland by the court of Denmark on purpoſe to contradict Anderſon's account; he publiſhed ſome obſervations on Iceland, but from a too great deſire to pleaſe his employers, he fell into the oppoſite

error, and paints all his objects with a glow of colouring that does not exactly correspond with the truth.

In Richer's Continuation of Rollin's History is a history of Iceland, a most pitiful compilation, and full of the grossest errors that ever disgraced the historical page.

Under the authority of the Royal Society of Sciences at Copenhagen, Eggert Olafsen and Biarne Povelsen, two men of learning, natives of Iceland, and residing in the country, travelled all over that island, and gave, in two volumes in quarto, a faithful and ample account of all that deserves the attention of the learned and curious, illustrated by numerous engravings: but though the performance is accurate and circumstantial, yet it is unfortunately clogged with repetitions, and the facts are recounted in so tedious and uninteresting a manner, that it requires a most phlegmatic temper, and a large fund of patience, to go through the whole of this work, for it is filled with a long and dull recital of events, methodized in the most

moſt formal manner poſſible. It can therefore by no means be thought ſuperfluous, that Dr. Von Troil has favoured the literary world with his intereſting Letters on Iceland; a work which, on account of its varied matter, and the great learning diſplayed every where for the inſtruction of the curious reader, deſerves the warmeſt approbation of the public.

Men of talents and learning will, we flatter ourſelves, think highly of this preſent performance of Dr. Von Troil, though perhaps it may be ſometimes a little deficient in point of language.

The preſent tranſlation has been made from the laſt German edition, publiſhed by Meſſrs. Troil and Bergman, with numerous additions and corrections; and though it is not oſtentatiouſly recommended to the public for any elegance or accuracy of ſtyle, it may however be ſafely ſtated as a faithful tranſlation from the original, and a work of real merit and utility.

We

We leave it to the unprejudiced reader to form a judgment of this performance, which is replete with variety of matter, treated on in an inſtructive and ſatisfactory manner; and likewiſe on the great learning relative to natural hiſtory, hiſtorical, antiquarian, and philological ſubjects, that are every where blended in the context of the following letters: and we are of opinion, that, in reſpect to theſe points, this work requires no apology for offering it to the impartial public.

As to its utility, it will not be unneceſſary to prefix a few obſervations on the importance of Icelandic literature.

The Engliſh language was originally ſo nearly related to that of Iceland, that we need only caſt our eyes on a gloſſary, to ſee the affinity of both languages, and the great light the one receives from the other.

The Normans and Danes, who were during a conſiderable time maſters of England, introduced into it many cuſtoms,

cuſtoms, laws, and manners, which would remain inexplicable; but the Icelanders being originally deſcended from the ſame Normans, and living on an iſland that has very little intercourſe with the reſt of the world, have preſerved their language, manners, and laws in their primitive ſimplicity; nay, all the hiſtorical accounts of the North are contained in the hiſtorical ſayings (*ſagas*) of the Icelanders, which are very numerous, and would be of very important ſervice in the inveſtigation of the origin of the language, manners, and laws of England. Nor can it be advanced that this kind of ſtudy could not be purſued amongſt us for want of theſe hiſtorical monuments of the Icelanders; ſince by the known indefatigable zeal for the promotion of all branches of literature, and the moſt diſintereſted generoſity of Joſeph Banks, Eſq. P. R. S. one hundred and ſixty-two Icelandic manuſcripts have been preſented to, and are depoſited in the Britiſh Muſeum.

The hiſtory of the northern nations, their divinities, religion, principles, and tenets, together with their poetry, preſent the philoſophic reader with ſubjects worthy of his ſpeculation; they at the ſame time account for many hiſtorical events, and for many a curious cuſtom preſerved by ſome one or other of the nations deſcended from the ſame root with theſe inhabitants of the North.

The ſubject of volcanos, and of the origin of certain kinds of ſtones and foſſils, have of late attracted the attention of philoſophers; but, in my opinion, they are no where treated with ſo much candour, truth, and philoſophical preciſion as in thoſe remarks which the Chevalier Torbern Bergman ſent to our author in form of a letter, and which he has here communicated to the public.

The whole iſland of Iceland is a chain of volcanos, the ſoil almoſt every where formed of decayed cinders, lava, and ſlags; and the numerous hot ſprings, eſpecially that called *Geyſer*, give full ſcope to the moſt curious

curious remarks on theſe ſubjects, ſince they are here obvious in ſo many varied ſhapes, and for that reaſon become inſtructive. Lava and ſome other productions of nature have not been hitherto ſubjected to chemical proceſſes: Profeſſor Bergman therefore deſerves the thanks of the public for his excellent letter, giving a very intereſting account of his experiments on all the various foſſils and natural productions of Iceland. The origin of the baſaltic pillars, ſuch as form the Giant's Cauſeway in Ireland, the whole iſland of Staffa, and more eſpecially Fingal's Cave, has of late been much ſpoken of by travellers and learned mineralogiſts. Some aſcribe their regular configuration to cryſtallization: others pretend the ſubterraneous fire to be the cauſe of their regular columnar ſhape; but the ingenious Chevalier Torbern Bergman proves, by the moſt ſolid arguments, that the baſalt pillars are no lava, or any-ways related to volcanic ſubſtances, and that their regular columnar ſhape, he ſuggeſts, is owing to ano-

ther cauſe, and by his reaſoning renders it highly probable.

We are at the ſame time preſented with a view of the *primitive earths*, that originally compound all earthy and ſtony bodies hitherto diſcovered on the ſurface of our globe; and their characters are here alſo ſet forth in the moſt eaſy and obvious manner by experiments.

This great and intereſting circumſtance alone would be ſufficient to recommend the preſent performance to the peruſal of chemiſts, mineralogiſts, and philoſophers.

The letter of the Archiater Bach to Dr. Troil, on the diſeaſes of Iceland, contains the moſt curious and intereſting obſervations for the uſe of medical gentlemen. In ſhort, there is ſcarcely a claſs of readers who will not find inſtruction and entertainment in the ingenious performance of Dr. Uno Von Troil, the author of this book.

He is a Swede by birth, and deſcended of a noble family: his father, Samuel Von Troil, was archbiſhop of Upſal.

After

After having ſtudied divinity, the oriental and northern languages and antiquities, together with the various branches of natural philoſophy, he travelled, and viſited Germany, France, England, and Holland.

During his ſtay in England he was introduced to Mr. Banks, who was then returned from his voyage round the world, and preparing to go on a ſecond; but that not taking place, he was prompted to make a ſhort excurſion towards the Weſtern Iſlands and Iceland; and eaſily prevailed upon Dr. Von Troil to accompany him on this literary voyage.

After the return of Dr. Von Troil, he wrote letters to ſeveral learned men in his own country, eminent in the various profeſſions and branches of literature and ſcience, on the different matters he had obſerved in Iceland during his voyage: they were at firſt only intended to ſatisfy the ſolicitations and curioſity of his friends, who wiſhed to be made acquainted with whatever he had diſcovered worthy the notice of a

literary man, and that might likewiſe bid fair to afford amuſement.

The ſenator Count Charles Scheffer, a man of a benevolent character, and who patronizes learning in all its branches, together with its profeſſors, ſolicited our author to communicate them to the public: in compliance with which, they were publiſhed at Upſal in 1777 in octavo; and the next year after they appeared at the ſame place tranſlated into German, very much enlarged with additions of the author and alſo of the Chevalier Bergman.

Dr. Von Troil has for his talents, learning, and character been promoted in his native country to ſeveral places of honour and emolument, ſo that he may now be conſidered as the firſt man in Sweden in point of eminence in the eccleſiaſtical line, and in point of learning inferior to none: he has taken his degree of doctor of divinity, is principal chaplain to the king, preſident of the conſiſtory, rector of the great church of Stockholm,

holm, and prelate to all the Swediſh orders of knighthood.

Theſe curſory hints were thought neceſſary for uſhering his Letters on Iceland into the literary world; the public will, no doubt, be curious to know the particular obſervations made by a learned man on an iſland that Mr. Banks, one of the firſt characters of this country, thought deſerving a nearer inſpection by a voyage he undertook at a great expence, accompanied by ſeveral learned and ingenious men.

For the information of thoſe who wiſh to be acquainted with all the publications that have appeared, to treat either at large of Iceland, or examine ſome of its particular objects, we have here ſubjoined a very curious and complete catalogue of them.

CATALOGUE of Writers on ICELAND.

1 JOACHIM Leo wrote ſome verſes on Iceland in the German language, full of errors. There are four editions of them. Arngrim Jonæ, in his Commentario de Iſlandia, quotes the edition of 1561.

2 Jacobi Ziegleri Scondia ſeu Deſcriptio Groenlandiæ, Iſlandiæ, Norvegiæ, & Sueciæ. Francofurti 1575.

3 Jonſbogen (i. e. Jonſbook, an old book of laws) Hoolum (in Iceland) 1578. 8vo. and ſeveral editions ſubſequent to it.

4 Arngrim Jonæ brevis commentarius de Iſlandia. Hoolum 1592. 8vo. and Hafn. 1593. 8vo.

5 Ejuſd. Crymogæa ſeu rerum Iſlandicarum libri tres. Hamburg 1609, 1610, 1614, 1618, 1620, and 1630.

6 Blefkenii Iſlandia ſ. populorum et mirabilium, quæ in ea inſula reperiuntur, accuratior deſcriptio. Ludg. Batav. 1607. 8vo.

7 Arngrim Jonæ Anatome Blefkeniana. Hoolum 1612. 8vo. and Hamburg 1613. 4to.

8 Dan Fabritius de Iſlandia & Groenlandia. Roſtock 1616. 8vo

9 Arngrim Jonæ epiſtola pro patria defenſoria. Hamburg 1618. 4to. written in oppoſition to the preceding book.

10 Arngrim Jonæ Apotribe calumniæ. Hamburg 1622.

11 De regno Daniæ & Norvegiæ inſuliſque adjacentibus, tractatus varii collecti a Stephan Stephanio, Ludg. Batav. 1629. 12mo. from whence the part concerning Iceland is taken out, and printed ſeparately with the following title.

12 Iſlandicæ gentis primordia & vetus republica. Ludg. Bat. 1629. 12mo.

13 Arngrim Jonæ Athanaſia Gudbrandiana. Hamburg 1630.

14 Peder

14 Peder Clauſſon's Norriges og omliggende öars Beſkrifvelſe. Kiöb. 1632. 4to. and Kiöb. 1637. 8vo.

15 Arngrim Jonæ ſpecimen Iſlandiæ hiſt. & magna ex parte chorographicum. Amſt. 1643.

16 La Peyrere Relation de l' Iſlande, in a letter to Mr. de la Motte Vayer, dated 18 Dec. 1644. Is inſerted in the Recueil des Voyages au Nord, tom. I. Amſt. 1715. 8vo.

17 Wolfii Norrigia illuſtrata. Hafn. 1651. 8vo. and 4to.

18 Wolfii Norriges, Iſlands og Grönlands Beſkrifvelſe. Kiöb. 1651. 4to.

19 Hieronym. Megiſeri Septentrio Nov-antiqua, ſive die neue Nord-welt, Iſland, Groenland, &c. Leipz. 1653. 12mo.

20 Edda Iſlandorum A. C. 1215, per Snorronem Sturlæ iſlandice conſcripta, iſlandice, danice, & latine edita, opera P. J. Reſenii. Hafn. 1665. 4to. together with

21 Philoſophia antiquiſſima Norvego-danica dicta Volupſa, quæ eſt pars Eddæ Sæmundi, primum publici juris facta a P. J. Reſenio. Hafn. 1665. together with

22 Ethica Odini, pars Eddæ Sæmundi, vocata Haaramal, edita per P. J. Reſenium. Hafn. 1665.

23 Theod. Thorlacci diſſ. chorographica hiſtorica de Iſlandia, præs. Ægid. Strauch. Wittenb. 1666 and 1670. 4to. item 1690. 4to.

24 Erici Bartholini experimenta Chriſtalli Iſlandici diſdiaclaſtici. Hafn. 1669. 4to.

25 Voluſpa. Kiöbenhavn. 1673. 4to.

26 Martiniere neue Reiſe in die nordiſchen Landſchaften. Hamb. 1675. 4to. Tranſlated from the Engliſh. There is likewiſe a French edition, Paris 1682.

27 Aræ Multiſtii Schedæ. Skallholt 1688. 4to. Oxford 1696. Kiöb. 1733. 4to.

28 Landnama Bok. Skallholt 1688. 4to. Is likewiſe publiſhed at Copenhagen, with a Latin tranſlation, notes,

notes, and ſeveral indexes under the title of Iſlands Landnama-Bok, h. e. Liber originum Iſlandiæ, Editio noviſſima, ex manuſcriptis Magnæanis ſumptibus peril. Suhmii. Havn. 1774. 4to.

29 Gahm de ratione anni ſolaris apud veteres Iſlandos. This memoir is printed at the end of Araæ Schedæ, in the Copenhagen edition.

30 Thordr Thorlaks Diſſ. de ultimo montis Hecklæ in Iſlandia incendio. Hafn. 1694.

31 Gahm de prima religionis in Iſlandia fundatione. Hafn. 1696.

32 Deſcription du Nord. 1698. 12mo.

33 Niewe beſchryvinge van ,Spitſbergen, Iſland, Groenland end de beygelegen Eylanden.

34 Einar Thorſt. vita. Hafn. 1700.

35 Reiſe nach Norden, worinneu die ſitten, Lebenſarten and Aberglauben der Norweger———and Iſlander accurat beſchrieben werden. Leipz. 1711. 12mo.

36 Blefkenii Hiſtorie van Lap-und Finland, hier is bygevoegt de beſchryving van Is-en Groenland. Leuvarden 1716. 8vo.

37 Vetterſten de Poeſi Scaldorum Septentrionalium. Upſal. 1717. 8vo

38 Relation om det foerſkrekkelige Vandfall og exundation af Bierget Katlegiaa paa Iſland 1721. Copenhagen 1727. 4to.

39 Kort berattelſe om berget Krabla paa Iſland, ſamt andre Darnaſs intil grantſande Berg, Hwilka nyligen begynt at intiſpruta eld och brinna. This account of the burning of the mount Krabla was printed probably in the year 1724, at Stockholm, on four pages in 8vo.

40 Benedict Thorſtenſon efterrettning on den jordbrand ſom 1724 og folgende Aar i Bierger Krafla og de dar omkring liggende Herreder har graſſeret. Kiöbenhafn 1726. 8vo.

41 Olavi O. Nording Diſſ. de Eddis Iſlandicis. Upſal. 1735. 4to. Mr. Oelrichs at Bremen has reprinted this

this Diſſ. in his Opuſculis Daniæ & Sueciæ litteratæ, tom. I. 1774.

42 Joh. Dav. Koehler proluſio de Scaldis ſeu poetis gentium arctoarum. Altdorf 1738. 4to.

43 Er. Jul. Biörner, Inledning til de Hfwerborna Goeters gamla Hafder ſar deles gotiſka ſprakets Forman och Sagornas Kanned om. ſeu, Introductio in Antiquitates Hyperboreo-Gothicas. Stockholm 1738. fol.

44 Ejuſd. tractatus de Varegis heroibus Scandianis. Stockholm 1743. 4to.

45 Lackmannus de computatione annorum per hyemes priſcis gentibus hyperboreis uſitata. Kiel 1744. 4to.

46 De Yfverborna Atlingars Lara—Hyperboreorum Atlandiorum ſeu Suiogotorum et Nordmandorum Edda, hoc eſt Atavia, ſeu fons gentilis illorum & Theologiæ & Philoſophiæ. Jam demum verſione Suinonica donata accedente latina—ad MS. quod poſſidet Bibliotheca Upſalienſis—opera Joh. Goranſſon. Upſ. 1746. 4to. This edition of the Edda was not finiſhed.

47 Iſlanſka taxan. Hoolum 1746. 4to.

48 John Anderſſon Nachrichten von Iſland, Groenland, und der Straſſe David. Hamb. 1746. It appeared likewiſe tranſlated into the Daniſh language. Copenh. 1748. A French tranſlation has alſo been publiſhed by Mr. Sellius, 1751. 12mo. 2 vols.

49 Octroy foer det Iſlandſke Societet. Kiöb. 1747. 8vo.

50 Avertiſſement om Anderſſons Tractat om Iſland. Kiöb. 1748. 8vo.

51 Joh. Thorkelſſons tillgift til Anderſſon om Iſland. Kiöb. 1748. 8vo.

52 Eggerhard Olavius Enarrationes hiſtoricæ de Iſlandiæ natura & conſtitutione. Hafn. 1749. 8vo.

53 Ejuſd. Diſſ. de ortu & progreſſu circa ignem Iſlandiæ ſubterraneum. Hafn. 1749. 4to.

Biarni

54 Biarni Pauli Obſervationes de alga ſaccharifera maris Iſlandici. Hafn. 1749. 8vo.

55 Arnae Oddeſ. vita, inſerted in the Nova literaria. Hafn. anni 1750.

56 De Gamla Normanners Patriarkaliſka Lara pa Swenſka och Lat. af Joh. Goranſſon. Stockholm 1750. 4to.

57 Olai Wormii Epiſtolæ, Hafn. 1751. 2 vols. 8vo.

58 Tilforladeliga efterretninger om Iſland med ett nytt Landkort, og 2 Aars metereologiſka Obſervationer af Niels Horrebow. Kiöb. 1750. 8vo. This performance is likewiſe tranſlated into German 1752. 8vo.

59 Specimen Iſlandiæ non barbaræ, in nouvellis literariis Hafnienſibus 1752.

60 Nachrichten von Iſland, a ſhort abſtract of Horrebow's book inſerted in a periodical paper called Beytragen zum Nutzen und Vergnugen. Greifswald 1753. 4to.

61 Erici tentamen de nominibus & cognominibus Septentrionalium. Hafn. 1753. 8vo.

62 Th. Nicolai de commeatu Iſlandorum navali. 1753. 8vo.

63 Svein Solveſen Tyro Juris Iſlandicus. Kiöb. 1754. 8vo.

64 Vidalins Bref til Jon Arneſen de jure patronatus Iſlandorum, tranſlated into Daniſh, and publiſhed by Magnus Ketilſon.

65 Diſſertatiuncula de montibus Iſlandiæ cryſtallinis, auct. Theodr Torkelli I. Vidalino, ſcholæ Skallholtenſis eo tempore Rectore. Tranſlated from the Latin MS. into German, and publiſhed in the Hamburg Magazine, volume XIII. N° I. and II. 1754. 8vo.

66 Diſquiſitiones duæ hiſtoricæ antiquariæ. Prior de veterum Septentrionalium, imprimis Iſlandorum peregrinationibus; poſterior de Philippia ſeu amoris equini apud priſcos borcales cauſis——per Joh. Erici. Lipſ. 1755. 8vo. The firſt is tranſlated into

into German, and inſerted into Schlozer's Northern Hiſtory. 1771. p. 556.

67 Ejuſd. Specimen Obſervationum ad antiquitates Septentrional.

68 Ejuſd. Commentarius de expoſitione infantum ad veteres Septentrionales.

69 Introduction à l'Hiſtoire de Dannemark, par Mr. Mallet, à Copenh. 1755. 4to. to which a tranſlation of the Edda is prefixed. The ſame is tranſlated into Engliſh, 2 vols. 8vo. and into German. Greifswald 1765. 4to.

70 Joh. Snorronis de Agricultura Iſlandorum. Hafn. 1757. 8vo.

71 Hald Jacobſens efterrætningar om de i Iſland ildſprudende Bierge. Kiöb. 1757. 8vo.

72 Ol Eigilſon's Berettnelſe om de tyrkiſke Soerovere i Iſland. Kiöb. 1757. 8vo.

73 Nic. Pet. Sibbern idea hiſtoriæ litterariæ Iſlandorum in Dreyer's Monumenta anecdota. I Tom. Lubecæ 1760. 4to.

74 Balle oekonomiſka Tanker ofwer Iſland til hoyere betankning. Kiöb. 1760, 1761. 2 vols. 8vo.

75 Joh. Finnæus tentamen hiſtorico-philologicum circa Norvegiæ jus eccleſiaſticum priſcum, and

76 Ejuſd. Curæ poſteriores in hoc jus. Hafn. 1762 and 1765. 4to.

77 Thorſten Nicol. de commeatu veterum Iſlandorum reſtituendo. Hafn. 1762. 8vo.

78 Joh. Arneſon Inledning til den gamle og nya Iſlandſke Rattegaang, udgiven af I. Erichſen. Kiöb. 1762. 4to.

79 Joach. Stechau de fide hiſtorica monumentor. Iſlandic. Lund. 1763.

80 Five pieces of Runic poetry, tranſlated from the Icelandic language. London 1763. 8vo.

81 M. Olafsen's forſog til Landraſenets forbedring i Iſland. Kiöb. 1765. 8vo.

82 Ejuſd. Anmarkningar till Jons boks Danſka ofwerſattelſe. Kiöb. 1765. 8vo.

83 Egil

83 Egil Thorhallſens forſwar for ſin ofwerſattelſe. Kiöb. 1765. 8vo.

84 H. Finnſen efterettning om tilgragelſerne vid Bierget Hekla udi Iſland i April og foljende manader. Kiöb. 1767.

85 Olavii Syntagma de Baptiſmo veterum. Hafn. 1769. 4to.

86 Breve om Agerdyrknings muelighed i Iſland fra Hans Finnſen 1769 and 1772.

87 Joh. Peterſen om den ſaa Kallade Iſlandſke ſkiorbiugg. Soroe 1769. 8vo.

88 Erichſen om Iſlands up Komſt. Kioebenhafn 1770. 4to.

89 Skuli Magnuſſon um thann Iſlenſka Garnſpuna. Kiöb. 8vo.

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110 Kriſtin-rettr hinn gamli—Jus Eccleſiaſticum vetus ſ. Thorlacco-Kettilianum conſtitutum, A. C. 1123, Iſlandice & Latine, edit Grimus Joh. Thorkelin. Hafn. 1775.

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117 Diſſ. inauguralis de Lichene Iſlandico, Præſ. Trommſdorff. Reſp. Reiſſe. Erfurth 1778.

118 Die Iſlandiſche Edda. Das iſt: die geheime Gotteſlehre der ælteſten Hyperboraer—im Jahr. 1070 to 1075, aus alten runiſhen Schriften edirt von Samund Froden, hiernachſt im Jahr 1664, durch Reſen, und nun in die hochteutſche Sprache mit einem Verſuch zur rechten Erklarung uberſezt und edirt von J. Schimmelmann. Stettin 1778. 4to.

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This Catalogue contains all the writers of any conſequence on Iceland, or on matters any way relative to, or concerning that country.

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An
accurate & correct
MAP OF
ICELAND
compiled
from Surveys and
authentic Memoirs *by*
Messrs. Ericksen & Schoonning

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LETTERS ON ICELAND.

*LETTER I.

To Professor BERGMAN.

On the Effects of the Fires in Iceland.

SIR,

SINCE I am happily returned from a very pleasant summer's excursion through the western islands of Scotland, to Iceland and the Orkneys, it is with peculiar pleasure that I take this opportunity of assuring you of my esteem and friendship. It is probably not unknown to you, that Mr. Banks and Dr. Solander have been disagreeably disappointed when they were on the point of setting out on a new voyage round the world last summer. How-

* This letter was first published in the year 1773, in the Upsal newspapers, N° 3, 4, 6, and 8.

ever, in order to keep together and employ the draughtſmen and other perſons whom they had engaged for their voyage to the South-Sea, they reſolved upon another excurſion. It was impoſſible to chuſe a better one than that to Iceland; and you may eaſily conceive, Sir, that though I was ready to ſet out on my return to Sweden, I did not heſitate a moment in accepting their offer to accompany them. To ſay the truth, I was glad to viſit a country where I could not only hope to find many remains of our antient language, but where I was alſo certain to ſee nature in a new point of view.

I have not been diſappointed in either of my expectations; and I could never have found a happier opportunity than that of making this voyage in the company of Mr. Banks and Dr. Solander, of whom it would be unneceſſary to ſay more, as they are ſo well known both to you and to the learned and ingenious throughout Europe.

I know, Sir, that every information will be welcome to you, which concerns

cerns thoſe objects that attracted my attention there; and there is no one who would communicate this information to you with more pleaſure than myſelf; but as it would require too much prolixity to mention every thing, I ſhall only in this letter ſpeak of the principal operations of the fires in Iceland, a ſubject which, I am convinced, is one of the moſt important.

On our arrival in Iceland on the 28th of Auguſt 1772, we directly ſaw a proſpect before us, that, though not pleaſing, was uncommon and ſurprizing. Whatever preſented itſelf to our view bore the marks of devaſtation; and our eyes, accuſtomed to behold the pleaſing coaſts of England and Scotland, now ſaw only the veſtiges of the operation of a fire, heaven knows how antient!

The deſcription of a country, where quite cloſe to the ſea you perceive almoſt nothing but craggy cliffs vitrified by fire, and where the eye loſes itſelf in high and rocky mountains covered with eternal ſnow, cannot poſſibly produce ſuch emotions as at firſt ſight

might entirely prepoſſeſs the thinking ſpectator. It is true, beauty is pleaſing both to our eyes and our thoughts; but wonderful nature often makes the moſt laſting impreſſions.

We caſt anchor not far from Beſſeſtedr, the dwelling-place of the celebrated Sturleſon, where we found two tracts of lava called *Gorde* and *Hualeyre-Hraun* (for what we and the Italians call Lava is in Iceland called *Hraun*, from *Hrinna*, to flow) of which the laſt particularly was remarkable, ſince we found there, beſides a whole field covered with lava, which muſt have been liquid in the higheſt degree, whole mountains of turf. Chance had directed us exactly to a ſpot on which we could better, than on any other part of Iceland, conſider the operations of a fire which had laid waſte a tract of ten or twelve miles *.

* The miles mentioned by Dr. Troil are always Swediſh, ten and a half of which are equal to a degree on one of the great circles of the globe; and therefore one Swediſh mile is nearly equal to ſix Engliſh ſtatute-miles. Ten or twelve miles are therefore ſixty or ſeventy-two Engliſh miles.

We ſpent ſeveral days here in examining every thing with ſo much the more pleaſure; for we found ourſelves, as it were, in a new world.

We had now ſeen almoſt all the effects of a volcano, except the crater, from which the fire had proceeded: in order therefore to examine this likewiſe, we undertook a journey of twelve days to Mount Heckla itſelf; we travelled fifty or ſixty miles * over an uninterrupted track of lava, and gained the pleaſure of being the firſt who ever reached the ſummit of this celebrated volcano. The cauſe that no one had been there before is partly founded in ſuperſtition, and partly in the extreme difficulty of the aſcent before the laſt eruption of fire. There was not one of our company who did not wiſh to have his cloaths a little ſinged, only for the ſake of ſeeing Heckla in a blaze; and we almoſt flattered ourſelves with this hope, for the biſhop of Skallholt had informed us

* Three hundred or three hundred and ſixty Engliſh miles.

by letter, in the night between the 5th and 6th of September, the day before our arrival, flames had proceeded from it; but now the mountain was more quiet than we wiſhed. We however paſſed our time very agreeably, from one o'clock in the night till two next day, in viſiting the mountain. We were even ſo happy, that the clouds which covered the greateſt part of it diſperſed towards evening, and procured us the moſt extenſive proſpect imaginable. The mountain is ſomething above five thouſand feet high, and ſeparates at the top into three points, of which that in the middle is the higheſt. The moſt inconſiderable part of the mountain conſiſts of lava, the reſt is aſhes, with hard, ſolid ſtones thrown from the craters, together with ſome pumice-ſtones, of which we found only a ſmall piece, with a little native ſulphur. A deſcription of the various kinds of ſtones to be found here would be too prolix, and partly unintelligible; and I ſo much the more willingly omit it, as I hope to ſatisfy your curioſity, as ſoon as

the

the collection I made of them arrives in Sweden.

Amongſt many other craters or openings, four were peculiarly remarkable; the firſt, the lava of which had taken the form of ſtacks of chimneys, half broken down; another, from which water had ſtreamed; a third, all the ſtones of which were red as brick; and laſtly, one from which the lava had burſt forth in a ſtream, and was divided at ſome diſtance into three arms. I have ſaid before, that we were not ſo happy to ſee Heckla vomit fire; but there were ſufficient traces of its burning inwardly; for on the upper half of it, covered over with four or five inches deep of ſnow, we frequently obſerved ſpots without any ſnow; and on the higheſt point, where Fahrenheit's thermometer was at 24° in the air, it roſe to 153° when it was ſet down on the ground; and in ſome little holes it was ſo hot, that we could no longer obſerve the heat with a ſmall pocket thermometer. It is not known whether, ſince the year 1693, Heckla has been burning till

1766, when it began to vomit flames on the firſt of April, burnt for a long while, and deſtroyed the country many miles around. Laſt December ſome flames likewiſe proceeded from it; and the people in the neighbourhood believe it will begin to burn again very ſoon, as they pretend to have obſerved, that the rivers thereabouts are drying up. It is believed that this proceeds from the mountain's attracting the water, and is conſidered as a certain ſign of an impending eruption. Beſides this, the mountains of Myvatn and Kattlegia are known in this century, on account of the violent eruptions of the former, between the years 1730 and 1740, and of the latter in 1756.

But permit me, Sir, to omit a farther account of the volcano at this time*, in order to ſpeak of another effect of the fire, which is more curious and as wonderful as the firſt, therefore muſt be the more remarkable, as there is not in

* Dr. Troil treats more at large of the Icelandic volcanoes in his 18th and 19th letters; and in the 20th he ſpeaks more particularly of Mount Heckla.

any

any part of the known world any thing that reſembles it; I mean the hot ſprings of water which abound in Iceland *.

They have different degrees of warmth, and are on that account divided by the inhabitants themſelves into *laugar*, or warm baths, and *huerer*, or ſprings that throw up the water to a conſiderable height; the firſt are found in ſeveral other parts of Europe, though I do not believe that they are employed to the ſame purpoſes in any other place; that is to ſay, the inhabitants do not bathe in them here merely for their health, but they are likewiſe the occaſion for a ſcene of gallantry. Poverty prevents here the lover from making preſents to his fair one, and nature preſents no flowers of which garlands elſewhere are made: it is therefore cuſtomary, that inſtead of all this the ſwain perfectly cleanſes one of theſe baths, which is to be afterwards honoured with the viſits of his bride. The other kind of ſprings

* The 21ſt letter treats more fully of the hot ſprings in Iceland.

men-

mentioned above deſerves more attention. I have ſeen a great number of them; but will only ſay ſomething of three of the moſt remarkable. Near Laugervatn, a ſmall lake of about a mile in circumference, which is about two days journey diſtant from Heckla, I ſaw the firſt hot ſpouting ſprings; and I muſt confeſs that it was one of the moſt beautiful ſights I ever beheld. The morning was uncommonly clear, and the ſun had already begun to gild the tops of the neighbouring mountains; it was ſo perfect a calm, that the lake on which ſome ſwans were ſwimming was as ſmooth as a looking-glaſs, and round about it aroſe, in eight different places, the ſteam of the hot ſprings, which loſt itſelf high in the air.

Water was ſpouting from all theſe ſprings; but one in particular continually threw up in the air a column from 18 to 24 feet high, and from 6 to 8 feet diameter; the water was extremely hot. A piece of mutton, and ſome ſalmon trouts, as likewiſe a ptarmigan, were almoſt boiled to pieces in ſix minutes, and taſted excellently.

I wiſh it was in my power, Sir, to give you a deſcription of this place as it deſerves; but I fear it would always remain inferior in point of expreſſion. So much is certain at leaſt, nature never drew from any one a more chearful homage to her great Creator than I here paid him.

At Reikum was another ſpout of the ſame ſort; the water of which, I was aſſured, roſe to 60 or 70 feet perpendicular height ſome years ago; but a fall of earth having almoſt covered the whole opening, it now ſpouted only between 54 and 60 feet ſideways. We found here a great many petrified leaves in this place, as likewiſe ſome native ſulphur, of which alſo the water had a much ſtronger taſte than any where elſe.

I have reſerved the moſt remarkable water-ſpout for the end; the deſcription of which will appear as incredible to you as it did to me, could I not aſſure you that it is all perfectly true, for I would not aver any thing but what I have ſeen myſelf. At Geyſer, not far from Skallholt, one of the epiſcopal

copal ſees in Iceland, a moſt extraordinary large ſpouting fountain is to be ſeen, with which the celebrated waterworks at Marley and St. Cloud, and at Caſſel, and Herrenhauſen near Hanover, can hardly be compared. One ſees here, within the circumference of half a mile *, 40 or 50 boiling ſprings together, which, I believe, all proceed from one and the ſame reſervoir. In ſome the water is perfectly clear, in others thick and clayey; in ſome, where it paſſes through a fine ochre, it is tinged red as ſcarlet; and in others, where it flows over a paler clay, it is white as milk.

The water ſpouts up from all, from ſome continually, from others only at intervals. The largeſt ſpring, which is in the middle, particularly engaged our attention the whole day that we ſpent here, from ſix in the morning till ſeven at night. The aperture through which the water aroſe, and the depth of which I cannot determine, was 19 feet in diameter; round the top of it

* About three Engliſh miles.

is

is a baſon, which, together with the pipe, has the form of a cauldron; the margin of the baſon is upwards of nine feet one inch higher than the conduit, and its diameter is of fifty-ſix feet. Here the water does not ſpout continually, but only by intervals ſeveral times a day; and as I was informed by the people in the neighbourhood, in bad rainy weather, higher than at other times.

On the day that we were there, the water ſpouted at ten different times, from ſix in the morning till eleven A. M. each time, to the height of between five and ten fathoms; till then the water had not riſen above the margin of the pipe, but now it began by degrees to fill the upper baſon, and at laſt ran over. The people who were with us told us, that the water would ſoon ſpout up much higher than it had done till then, and this appeared very credible to us. To determine its height therefore, with the utmoſt accuracy, Dr. Lind, who had accompanied us on this voyage in the capacity of an aſtronomer, ſet up his quadrant.

Soon

Soon after four o'clock we obſerved that the earth began to tremble in three different places, as likewiſe the top of a mountain, which was about three hundred fathoms diſtant from the mouth of the ſpring. We alſo frequently heard a ſubterraneous noiſe like the diſcharge of a cannon; and immediately after a column of water ſpouted from the opening, which at a great height divided itſelf into ſeveral rays, and according to the obſervations made with the quadrant was ninety-two feet high. Our great ſurprize at this uncommon force of the air and fire was yet increaſed, when many ſtones, which we had flung into the aperture, were thrown up again with the ſpouting water. You can eaſily conceive, Sir, with how much pleaſure we ſpent the day here; and indeed, I am not much ſurprized, that a people ſo much inclined to ſuperſtition as the Icelanders are, imagine this to be the entrance of hell; for this reaſon they ſeldom paſs one of theſe openings without ſpitting into it; or, as they ſay, *uti fandens mun*, into the devil's mouth.

But

But I think it is time to finiſh my long letter; and I will only try your patience with one thing more, which likewiſe deſerves to be better known. Natural hiſtorians always obſerved thoſe large remarkable pillars, which the hand of nature has prepared in Iceland, and in ſome other places, with the greateſt attention. The Giant's Cauſeway has, till now, been conſidered as the largeſt and moſt regular aſſemblage of theſe columns; but we have diſcovered one on our expedition through the weſtern iſlands of Scotland, which infinitely ſurpaſſes it. The whole iſland of Staffa * conſiſts almoſt entirely of theſe pillars, which are as regular as can be imagined; they ſeem to be of the ſame ſubſtance as the Iriſh ones, and have from three to ſeven ſides; each pillar is ſurrounded by others, that join ſo cloſely

* See the account of Staffa by Joſeph Banks, Eſq. inſerted in Pennant's Tour in Scotland, and Voyage to the Hebrides, 1772, page 299, 309, and the fine views of theſe baſalts, engraved after the accurate drawings executed by Mr. John Frederick Miller, employed by Mr. Banks, and communicated by the laſt-mentioned gentleman, for the adorning of Mr. Pennant's Tour.

to it, as to have only a very ſmall ſpace between them, which is frequenly filled up with a cryſtallized incruſtation. In moſt places the pillars are perpendicular; in others they are a little inclined; and yet in others they have the configuration of the timber-work in the inſide of a ſhip. The higheſt pillar was 55 feet one inch long; and each joint, from one to two feet. There is a cavern here which conſiſts entirely of theſe pillars; it is 367 feet long, 53,7 broad, and 117,6 high. It is three fathoms of water deep, ſo that it is eaſy to enter into it with a boat.

It is difficult to determine the queſtion, how theſe pillars have been formed; but it is more than probable, nay, almoſt certain, that they are the remains of an antient volcano, indiſputable tracts of which are found in many parts of Scotland. You muſt not in this place apply to me the ſtory Helvetius tells of a clergyman and a fine lady, who together obſerved the ſpots in the moon, which the former took for church ſteeples, and the latter for

for a couple of happy lovers. I know that we frequently imagine to have really found what we moſt think of, or moſt wiſh for; but I ſincerely aſſure you, that I do not ſpeak of ſuch fires without the moſt deciſive opinions. I will, however, reſerve a further account of theſe extraordinary productions till my return home, when I flatter myſelf I ſhall be able to give you entire ſatisfaction.

LETTER II.

To the Librarian Royal Mr. GJÓRWELL.

Of Iceland in general.

Utrecht, Jan. 22, 1773.

SIR,

YOU are, no doubt, informed of the voyage Mr. Banks and Dr. Solander undertook laſt ſummer to Iceland, as well as of my having accompanied theſe gentlemen on that expedition. I need not tell you what reaſons determined me to become one of their company. You can eaſily conceive how many different circumſtances might have perſuaded a curious Swede to viſit a country remarkable in ſo many reſpects: I am perfectly ſatisfied with my voyage, and can eaſily convince you of it, by communicating to you ſome little account of what principally attracted our attention during its courſe.

We

We ſet ſail from London on the 12th of July laſt in a ſhip, for which one hundred pounds ſterling were paid every month. Beſides Mr. Banks, Dr. Solander, and myſelf, we had on board an aſtronomer *, a lieutenant of the navy (a very worthy man, his name is Gore, and deſerves to be mentioned, as he is, as far as we know, the firſt who has ſailed three times round the world †) together with a lieutenant, three draughtſmen, and two writers, who, with the ſeamen and ſervants, made about forty people.

We firſt landed on the Iſle of Wight, which is a little paradiſe, where we ſpent two days. Nature ſeems to have ſpared none of her favours to embelliſh it; and I know not any place in it that does not preſent a pleaſing

* Dr. James Lind of Edinburgh, who is well known by many memoirs inſerted in the Philoſophical Tranſactions, and other ingenious publications.

† Captain Dampier did it a long time before Mr. Gore, viz. Cowley and Dampier, 1683, 1684; Dampier and Funnel, 1689, 1691; Woodes, Rogers, and Dampier, 1708, 1711. If lieutenant Gore and captain Charles Clerk return ſafe home from the voyage they are now engaged in, they both will have ſailed four times round the world.

view to the obſerver. The inhabitants reſemble their iſland; they live in a little community among themſelves; they are not very rich, neither have they any beggars. They are generally cheerful, cleanly, and obliging; and there are but few inſtances among them of any one marrying a perſon who did not at that time reſide or afterwards ſettle on the iſland.

From thence we ſailed to Plymouth, where we ſaw the docks, magazines, and every thing belonging to them worthy of notice, and then proceeded towards St. George's Channel.

We had intended to land on the Iſle of Man, as it is one of the few places where the Runic characters have been brought by the Danes, and the only one, except the north, where ſome of our old Runic ſtones are found; but at ſea we cannot always act according to our pleaſure: the wind obliged us to leave the Iſle of Man on our right, and to continue our courſe to the weſtern iſlands of Scotland.

It is exceedingly pleaſant to ſail among theſe iſlands, though not very ſafe, without a good wind and expert pilots; for

for in the firſt caſe you muſt depend upon the ebb and flood; and in the ſecond you are in continual danger on account of the great number of rocks.

The nature of the country is ſuch, that I do not wonder at it its having given birth to a Fingal, and an Oſſian. It is not the only place where we have ſeen heroes produced among the mountains; and what can be more calculated to form a poet, than wild romantic and enchanting ſcenes of nature, which are here ſo pleaſingly blended?

It would be tedious to enumerate all the iſles we have viſited. The moſt remarkable are Oramſay and Columbkill, on account of their antiquities; Scarba, for its known water-drain, (Vattu-drag); and Staffa, on account of its natural pillars, which hitherto have been little known, and ſurpaſs whatever has been obſerved before of the kind,

You know, Sir, that the inhabitants of theſe iſles, as well as in moſt places of the Highlands of Scotland, have a language of their own, which they call Erſe, and which is a remnant of the

Celtic. In this language Oſſian wrote his admirable poems; and though the inhabitants cannot at preſent produce any thing comparable to them, yet I hope, on my return home, to give you proofs of their being able to write both with elegance and judgment. As it is very extraordinary that this language ſhould have preſerved it itſelf here ſo long *, it will per-

* The very little connection that the antient inhabitants of the Scots Highlands and of the Hebrides had with other nations (eſpecially before the Union, which has in every reſpect been beneficial to them) is the true cauſe that the Erſe language has ſo long been preſerved among them. Beſides theſe reaſons there is another, which accounts almoſt for them all; the poverty of the ſoil and inclemency of climate admit of very little cultivation, ſo that theſe parts have very few natural productions which might tempt foreigners to viſit them: ſome few gifts of nature are, no doubt, lodged in the boſom of the hills of Scotland; but hitherto indolence and want of induſtry in the natives have neglected theſe riches: it is only within a few years that commerce has begun to raiſe its head, which alone induces other nations to frequent this or any country. It is therefore not ſo very extraordinary, that in a mountainous country the remains of antient nations ſhould be found, who preſerve for a great length of time their language. In the Caucaſus are ſtill exiſting the poſterity of ſeveral nations who croſſed theſe mountains in their attempt to conquer Aſia and Europe; and within a ſmall compaſs, more than five or ſix different languages are ſpoken.

haps

haps not be diſagreeable to you to be more particularly acquainted of the limits within which it is confined. I will readily ſketch them out to you, being able to do it with ſo much the more certainty, having received my information from Mr. Macpherſon, the only man in Great Britain who has particularly ſtudied this language.

It begins to be ſpoken on the eaſtern ſide at Nairn, and extends from thence through the whole country, and all the weſtern iſles. In the north its limits are at Cathneſs, where Erſe is only ſpoken in four pariſhes out of ten; in the other ſix, better Engliſh is ſpoke than in any other part of Scotland. There is in Iceland another dialect of it, as well as in Wales and Britany; however, they are not ſo different, but that a man born in either of theſe provinces, may make himſelf underſtood in the others. Had I been acquainted with the language of the Dalikarlians, I ſhould have had an opportunity of examining how far that ſimilarity is founded which, as it appeared to my ear, ſubſiſts between theſe two languages.

The country abounds with northern antiquities, ſuch as caſtles, ſtrong-holds, burying-places, and monuments, (Bautaſteinar) &c. and the people, who are obliging and extremely hoſpitable, have a number of cuſtoms reſembling thoſe obſerved by our country-people, ſuch as the celebration of the firſt of May *, and many others.

We now left theſe iſlands, and continuing our voyage arrived at laſt, on the 28th of Auguſt, at Iceland, where we caſt anchor at Beſſeſtedr, formerly the dwelling-place of the famous Sturleſon. We ſeemed here to be in another world; inſtead of the fine proſpects with which we had fed our eyes, we now ſaw only the horrid remains of many

* It is called in Sweden *war Frudag*; *le jour de notre Dame*, our Lady's Day. The witches are ſuppoſed to take, in the night preceding that day, their flight to Blakulla, a famous mountain; but it was formerly believed in Germany, that the witches travelled to the Bloxberg or Brocken, a high mountain contiguous to the Hartz foreſt. In Sweden the ſpring comes on about this time, and of conſequence the hard labour of ploughing, mowing, and reaping follow one another from that time, and require the beſt exertion of the ſtrength of the huſbandmen, to which they prepare themſelves on this day by frequent libations of their ſtrong ale; and they uſually ſay, *Maſte man dricka marg i benen*; You muſt drink marrow in your bones.

devaſ-

devaſtations. Imagine to yourſelf a country, which from one end to the other preſents to your view only barren mountains, whoſe ſummits are covered with eternal ſnow, and between them fields divided by vitrified cliffs, whoſe high and ſharp points ſeem to vie with each other, to deprive you of the ſight of a little graſs that ſprings up ſcantily among them. Theſe ſame dreary rocks likewiſe conceal the few ſcattered habitations of the natives, and a ſingle tree does no where appear that may afford ſhelter to friendſhip and innocence. I ſuppoſe, Sir, this will not inſpire you with any great inclination of becoming an inhabitant of Iceland; and indeed at firſt ſight of ſuch a country one is tempted to believe it impoſſible to be inhabited by any human creature, if the ſea, near the ſhores, was not every where covered with boats.

Though there is ſcarcely any country ſo little favoured by nature, and where ſhe appears throughout in ſo dreadful a form, yet Iceland contains about 60,000 people, who cannot properly

perly be called unhappy, though they are unacquainted with what in other places conſtitutes happineſs. I ſpent there above ſix weeks with the greateſt pleaſure, partly in ſtudying one of the moſt extraordinary ſituations of nature, and partly in collecting information from the natives, concerning their language, manners, &c. &c. As to the former, I have treated of it in a letter to profeſſor Bergman, which I doubt not he will communicate to you with pleaſure, if you deſire it. Of the latter I will here mention ſome particulars.

You know, Sir, that Iceland firſt began to be cultivated in the ninth century by a Norwegian colony, among which were many Swedes. They remained perfectly free in this corner of the world for a long time; but were, however, at laſt obliged to ſubmit to the kings of Norway, and afterwards became ſubject, together with Norway, to the kings of Denmark. They were at firſt governed by an admiral, who was ſent thither every year to make the neceſſary regulations;

gulations; but that mode has been changed many years, and a governor * appointed, who conſtantly reſides in the country. This poſt is, at preſent, occupied by Mr. Larr Thodal, who has formerly been Daniſh plenipotentiary in the commiſſion for ſettling the limits between Sweden and Norway, and has ſpent ſeveral years at Stockholm.

The Icelanders are of a good honeſt diſpoſition; but they are, at the ſame time, ſo ſerious and ſullen, that I hardly remember to have ſeen any one of them laugh: they are by no means ſo ſtrong as might be ſuppoſed, and much leſs handſome. Their chief amuſement, in their leiſure hours, is to recount to one another the hiſtory of former times; ſo that to this day you do not meet with an Icelander who is not well acquainted with the hiſtory of his own country: they alſo play at cards.

Their houſes are built of lava, thatched with turf, and ſo ſmall, that you hardly find room to turn in. They have no floors; and their win-

* Stiftſamtmann.

dows,

dows, inſtead of glaſs, are compoſed of thin membranes of certain animals. They make no uſe of chimnies, as they never light a fire, except to dreſs their victuals, when they only lay the turf on the ground. You will not therefore think it ſtrange, when I inform you, that we ſaw no houſes, except ſhops and warehouſes; and on our journey to Heckla we were obliged to take up our lodgings in the churches.

Their food principally conſiſts of dried fiſh, ſour butter, which they conſider as a great dainty, milk mixed with water and whey, and a little meat. They receive ſo little bread from the Daniſh company, that there is ſcarcely any peaſant who eats it above three or four months in the year. They likewiſe boil groats, of a kind of moſs (Lichen Iſlandicus) which has an agreeable taſte. The principal occupation of the men is fiſhing, which they follow both winter and ſummer. The women take care of the cattle, knit ſtockings, &c. They likewiſe dreſs, gut, and dry the fiſhes brought home

home by the men, and otherwiſe aſſiſt in preparing this ſtaple commodity of the country.

Beſides this, the company who yearly ſend fifteen or twenty ſhips hither, and who poſſeſs a monopoly which is very burthenſome to the country, export from hence ſome meat, eider-down, and falcons, which are ſold in the country for ſeven, ten, and fifteen rix-dollars a-piece. Money is very rare, which is the reaſon that all the trade is carried on by fiſh and ells of coarſe unſhorn cloth, called here Wadmal; one ell of wadmal is worth two fiſhes; and forty-eight fiſhes are worth a rix-dollar in ſpecie. They were better acquainted with gold at our departure, than at our arrival.

They are well provided with cattle, which are generally without horns: they have likewiſe ſheep, and very good horſes; both the laſt are the whole winter in the fields: dogs and cats they have in abundance. Of wild and undomeſtic animals they have only rats and foxes, and

ſome

ſome bears *, which come every year from Greenland with the floating ice; theſe, however, are killed as ſoon as they appear, partly on account of the reward of ten dollars, that the king pays for every bear, and partly to prevent them from deſtroying their cattle. The preſent governor has introduced rein-deer into the iſland; but out of thirteen, ten died on their paſſage, the other three are alive with their young.

It is extraordinary that no wood grows ſucceſsfully in Iceland; nay, there is ſcarcely a ſingle tree to be found on the whole iſland, though there are certain proofs of wood having formerly grown there in great abundance. Corn cannot be cultivated here to any advantage; though I have met with cabbages, parſley, turnips, peaſe, &c. &c. in five or ſix gardens, which were the only ones in the whole iſland.

* The bears here mentioned are the white polar or arctic carnivorous bears, abſolutely a ſpecies very diſtinct from our brown and black bears; though the celebrated Linneus only ſuſpected them to be a new ſpecies, not having ſeen and examined any of theſe animals.

I muſt

I muſt now beg leave to add a few words about the Icelandic literature. Four or five centuries ago the Icelanders were celebrated on account of their poetry and knowledge in hiſtory. I could name many of their poets, who celebrated in ſongs the warlike deeds of the northern kings; and the famous Snorre Sturleſon is the man to whom even the Swedes are indebted for the firſt illuſtration of their hiſtory. We for this reaſon ſet ſo high a value upon the antient Icelandic records and writings, that they have almoſt all been drawn out of the country: ſo exceedingly ſcarce are they become, that, notwithſtanding the pains I took during the whole time of my ſtay there, I got a ſight of only four or five Icelandic manuſcripts. In the inland parts of the country, our old language has been preſerved almoſt quite pure; but on the coaſts, where the natives have an intercourſe with the Daniſh merchants, it has been ſomewhat altered. Some ſpeak the Daniſh language very well; but thoſe who did not, could ſooner make themſelves in-

telligible to us Swedes, than to the Danes. We likewiſe found three or four Runic inſcriptions, but they were all modern, and conſequently of no value. I have ſaid before that the Icelanders took pleaſure in liſtening to their old traditional ſayings and ſtories; and this is almoſt the only thing that remains among them of the ſpirit of their anceſtors, for they have at preſent but few poets; and their clergy know little beſides ſome Latin, which they pick up in the ſchools eſtabliſhed in the epiſcopal ſees at Skallholt and Hooluni. Some of them, however, have ſtudied at the univerſity of Copenhagen; and I became acquainted with three men of great learning among them, who were particularly well verſed in the northern antiquities. One of them is the biſhop of Skallholt Finnur Jonſon, who is compiling an eccleſiaſtical hiſtory of Iceland; the two others are the provoſt Gunnar Paulſon, and Halfdan Ginarſon, rector at Hoolum.

That there is a printing-office in Iceland cannot be unknown, as we are acquainted with the rare editions of

Olof

Olof Tryggwaſſons, Landnama, Greenland and Chriſtendoms Sagas or Traditions, printed at Skallholt; but I did not expect to find the art of printing ſo antient here, as it was repreſented to be. A Swede, whoſe name was John Mathieſon, brought hither the firſt printing-preſs, between the years 1520 and 1530; and publiſhed in the year 1531 the Breviarium Nidaroſienſe. I have collected as many Icelandic books as I was able to diſcover; among the rareſt is the Icelandic bible, printed in folio at Hoolum in the year 1584. I hope likewiſe, that fifteen (till now unknown) traditional hiſtories. or ſagas, will be no unwelcome acquiſition.

You may judge, Sir, how agreeably I ſpent my time here in theſe occupations, that I applied to with ſo much the more pleaſure, as they all related to objects entirely new: add to which, the ſociety with Mr. Banks and Dr. Solander; the latter of whom is a moſt worthy diſciple of our Linnè, and unites a lively temper to the moſt excellent heart; and the former a

young gentleman of an unbounded thirſt after knowledge, reſolute, and indefatigable in all his purſuits, frank, fond of ſocial converſation, and at the ſame time a friend of the fine arts and literature: in ſuch company you will confeſs it was impoſſible I ſhould have the leaſt reaſon for regretting the time ſpent in this voyage.

I had almoſt flattered myſelf with the hopes of ſeeing Mr. Banks and Dr. Solander in Sweden; but I learn that they will be detained in England for ſome time. I much fear Dr. Solander will be for ever loſt to his native country, as well on account of the univerſal eſteem in which he is held in England, as of his being preferred to a more beneficial place at the Britiſh Muſeum than that which he formerly poſſeſſed.

Their voyage to the South Seas will probably make its appearance in April or May next. They have already begun to engrave the collections of animals and plants they made on their voyage, which will employ them ſeveral

veral years, as they muſt conſiſt, I ſhould apprehend, of near 2000 plates.

It would be writing a natural hiſtory were I to attempt to give a proper deſcription of theſe admirable collections. They have alone above 3000 fiſhes and other animals preſerved in ſpirits, moſt of which are new: Linnè might find among their plants, of which they have ſeveral ſets (one of which, I flatter myſelf, will find its way into Sweden) ſubjects for a new Mantiſſa.

I propoſe, when I have ſeen Holland, to make a little excurſion to Germany to ſee Mr. Michaelis, and ſoon afterwards return to my native country, where I ſhall have the honour of aſſuring you perſonally of the affectionate regard, &c. &c.

LETTER III.

To Chevalier IHRE.

On the phyſical Conſtitution of the Country.

Stockholm, June 20, 1773.

SIR,

THERE is no duty more agreeable to me than that of obeying your commands, in tranſmitting to you ſome account of Iceland, its antiquities, and what elſe relates to it. As I have happily had an occaſion of ſeeing the country myſelf, it may with juſtice be required of me, that I ſhould willingly communicate to others the informations I have been able to procure; and it would give me peculiar pleaſure if they enabled me to anſwer ſatisfactorily thoſe queſtions that you kindly propoſed to me.

Iceland

Iceland is juſtly reckoned amongſt the largeſt iſlands in the known world. It is ſixty miles in length, and its breadth exceeds forty Swediſh miles*.

The moſt uſeful among many maps of this country is that which has been made by Meſſrs. Erichſſen and Schonning in the year 1771, though it might be further improved.

Beſſeſtedr, in the ſouthern part of the iſland, not far from Hafnefiord, lies, according to Horrebow's account of Iceland, in 64 degrees 6 minutes of north latitude, and in 41 degrees of longitude, from the meridian of Stockholm; ſo that it is almoſt in the latitude of Hernóſand †.

The country does not afford a pleaſing proſpect to the eye of the traveller, though it preſents him with objects worthy of attention in many reſpects: for beſides innumerable ridges of mountains that croſs it in ſeveral directions, and ſome of which, on

* About 360 Britiſh ſea-miles in length, and about 240 in breadth.

† A town in Sweden.

account of their height, are covered with continual ice and ſnow, you only ſee barren fields between them, entirely deſtitute of wood, and covered with lava for the ſpace of many miles. This is certainly as incapable of giving the eye pleaſure, as it is unfit for any other uſe. On the other ſide, however, it cauſes the greateſt ſurprize in the attentive ſpectator, to ſee ſo many ſtriking proofs of the dreadful effects of volcanoes.

Though the coaſts are better inhabited, the inland parts of the country do not lie waſte and neglected; and one finds every where, ſometimes cloſe together, and ſometimes at greater diſtances, farms with ſome land belonging to them, that generally conſiſts of meadow-land, and ſometimes of hills thick ſpread with low ſhrubs and buſhes, the which they honour with the appellation of Woods.

In the whole iſland there are no towns, nor even villages; only ſingle farms are to be ſeen, ſome of which, however, conſiſt of ſeveral dwelling-houſes,

houſes, deſtined for the owner of the farm and his tenants (*hiá leygumann*) who procure from the proprietor a houſe and paſture for as many cows, horſes, and ſheep as they chooſe to agree for. On the eſtates of ſome peaſants who are better circumſtanced, there are even ſometimes dwellings for labourers (*huuſman*) who work for daily hire. All theſe farms belong either to the king, the church, or the peaſants themſelves *. I will mark the price of two of theſe farms, which were ſold a little before our arrival, that you may judge of their value. The one farm, whereon ten cows, ten horſes, and four hundred ſheep might be kept, was ſold for one hundred and twenty rix-dollars; and the other, which had ſufficient paſture for twelve cows, eighteen head of young cattle, above a year old, that had not yet calved (*ungnot*) eight oxen, fourteen

* In order to ſhew at once in what proportion the farms are diſtributed between the king, the church, and the farmers, I will here annex an abſtract taken from the Icelandic Villarium, or Land-book of the year 1695, which came into my poſſeſſion.

ABSTRACT from the ICELANDIC LAND-BOOK of 1695.

Of theſe farms in each ſyſſel belong	Jullbringe	Kioſar.	Borgarfiords.	Sneſialdſnas.	Hnappadals.	Dale.	Bardaſtrande.	Iſefiords.	Strande.	Hunavatns.	Skagafiords.	Vadle.	Thingey.	Mule.	Skaftefialds.	Rangervalla.	Arne.	Names of the ſyſſels or diſtricts.	Number of farms.
To the king,	90	40	10	22	25	2	6	21	21	85	40	82	51	45	102	6	4		718
To the biſhop's ſee of Skallholt,	6	2	37				4		3				1	4	13	32	202		304
To the biſhop's ſee of Hoolum,										39	196	61	49						345
Church glebe,	14	9	67	44	18	24	38	64	29	46	14	33	55	81	8	64	32		640
Glebe of clergy,	3	2	9	4	2	3	4	10	3	14	10	13	14	23	6	6	14		140
Glebe of ſuper-annuated clergy,	1	2	4	2		2	3	1	3		1			12	4	7	3		45
For maintaining the poor,	1		1	1				2		1	1		2	5	2				16
For maintaining hoſpitals,				1								1			1		1		4
To farmers,	11	36	216	59	23	149	132	161	66	145	104	133	134	187	47	153	91		1847
Total ſum,	126	91	344	199	68	180	187	259	125	329	366	323	306	357	183	268	347		4059

N. B. The Tranſlator has given this Table exactly as it ſtands in the Original; and though ſomewhat erroneous, he could not venture to correct it, as he is ignorant where the Errors occur.

horſes, and three hundred ſheep, for one hundred and ſixty dollars.

In ſome few places they have ſmall fenced ſpots near their houſes, in which they cultivate cabbage, parſley, ſpinach, turnips, patientia, potatoes, and ſome other roots and vegetables, together with flax and hemp. Fruit trees are looked for in vain, which is not to be wondered at, ſince ſtorms and hurricanes are here very frequent. Theſe have given riſe to the name of Storm-coaſt (*Wedrakiſta*) that has been given to ſome places in Iceland.

Theſe ſtorms have likewiſe prevented the growth of fir-trees, and Norway pitch-firs *, which governor Thodal had planted here, whoſe tops ſeemed to wither as ſoon as they were about two feet high, and then they ceaſed growing.

That wood has formerly grown in Iceland, can be proved from the Sagas or tradition ſtories of Landnama, Kialneſinga, Svarfdala, and Egill Skallagrimſonar. It is likewiſe proved by

* Pinus picea, Linn. and pinus abies, Linn.

the

the pieces that are frequently dug up in marſhes and fens, where not a ſingle buſh is to be ſeen at preſent. The ſubſtance, called by the natives *ſurturbrand*, is likewiſe a clear proof of it.

This ſurturbrand is evidently wood, not quite petrified, but indurated, which drops aſunder as ſoon as it comes into the air, but keeps well in water, and never rots: it gives a bright though weak flame, and a great deal of heat, and yields a ſouriſh though not unwholeſome ſmell. The ſmiths prefer it to ſea-coal, becauſe it does not ſo ſoon waſte the iron. The Icelanders make a powder of it, which they uſe to preſerve their cloaths from moths; they likewiſe apply it externally againſt the cholick. I have ſeen tea-cups, plates, &c. in Copenhagen made of ſurturbrand, that takes a fine poliſh. It is found in many parts of Iceland, generally in the mountains, in horizontal beds; ſometimes ſeveral on one another are to be met with, as in the mountain of Lacks in Bardeſtrand, where four ſtrata

of

of ſurturbrand are found with alternate beds of different kinds of ſtones.

I have brought a large piece of it with me to Sweden; it has evident marks of branches, the circles of the annual growth of the wood, leaves, and bark, in the ſurrounding clay: and there is ſome reaſon to believe, that theſe trees have been mixed in the lava thrown up by ſome eruption of fire or by an earthquake.

I am almoſt inclined to believe that ſome ſtreams of lava, which at the depth of fifteen feet, according to obſervations that have been made, can advance twelve thouſand Swediſh ells, of two feet each, in eight hours, by a declivity of forty-five degrees, have ſwept away theſe trees, which ſeem to have been of a conſiderable ſize, and buried them; and this is ſo much the more probable, as the ſurturbrand frequently has the appearance of coal. But as I do not know whether this opinion has ever been advanced before, and not having had opportunity of making ſufficient obſervations upon this conjecture, and as there is even

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ſome reaſon to ſuppoſe that a tree would directly be conſumed to aſhes in ſo violent a fire, though the contrary may alſo be poſſible, when it is in the ſame inſtant overturned, covered, and ſmothered; therefore I will not even venture to offer this opinion as probable.

There is ſtill another likely ſuppoſition. The trees may have been overturned by an earthquake, and then covered beneath the hot aſhes of a volcano, in the ſame manner as happened at Herculaneum, and other places, where whole towns have ſhared the ſame fate.

That there have been formerly conſiderable woods in Iceland, can ſcarcely be doubted; nay, there are at this time ſome ſmall ſpots covered with trees, as at Hallormſtad, Huuſefeld, and Aa, and in ſeveral other places. However, there are no fir or pine-trees; and the birch-trees now exiſting never exceed the height of eight or twelve feet, and are not above three or four inches thick, which is partly owing to bad management, partly to the de-

vaſtations

vaſtions cauſed by fire or hurricanes, and the Greenland floating-ice: the laſt is the cauſe that at Stadar-hrauns, Eyry, and Kiolfield, whole ſpots of land are ſeen covered with withered birch-trees. But theſe ſmall birch being found inſufficient to ſupply the inhabitants with fuel, they likewiſe make uſe of turf, fern, juniper, and black crake or crow-berry buſhes (*empetrum nigrum*); in other places they burn the bones of the cattle killed for butchers meat, and fiſhes moiſtened with train-oil; alſo dried cow-dung that has been the whole winter in the meadow; and laſt of all floating-wood. This floating-wood is obtained in great abundance every year, particularly at Langanas on the north-eaſt coaſt, at Hornſtrand on the north-weſt ſide, and every where on the northern coaſt of the country *. There are ſeveral different

* The immenſe quantity of wood floating down the Miſſiſſippi, the St. Lawrence, and other rivers of North America, are probably thoſe which are carried to the northern regions. From the gulph of Mexico a ſtrong current ſets acroſs the Atlantic in a ſouth-weſt to north-eaſt direction, or nearly, and carries many tropical fruits on the coaſt of Norway, the Feros, and Iceland: which remarkable circumſtance has been noticed by that

rent kinds of wood among it, the greateſt part is Norway pitch-fir *; but beſides this, one finds common fir, linden, willow †, cork-wood, and two

that curious obſerver and delineator of nature George Edwards. But the wood coming down the Miſſiſſippi is remarked by Boſſu, in his Travels through North America, vol. i. pag. 19. The coaſt of Greenland is benefited by drift-wood, in the ſame manner as Iceland. See Crantz's Hiſt. of Greenland, vol. i. pag. 37. The northern coaſt of Siberia is often covered with wood in a moſt aſtoniſhing manner. See John George Emelin's Travels through Siberia, vol. ii. pag. 415. Nor is the coaſt of Kamſchatka deſtitute of floating-wood. See J. F. Miller's collection of Ruſſian Tranſactions, vol. iii. pag. 67. The great rivers of Siberia, ſuch as the Lena, Kolyma, Yeniſea, and others, carry chiefly in ſpring many wood-trees along with their waters into the ocean, where it is often floating in various directions, ſet by winds and currents, and checked by the immenſe maſſes of ice, till, after many months and years, it is thrown up and left on the coaſt, for the benefit of the inhabitants of theſe frigid regions, which are too cold for the growth of trees. Iceland receives its drift-wood by ſtrong weſterly and north-weſterly gales, varying with ſoutherly winds, which ſeems to confirm the opinion, that the drift-wood comes from North America: it conſiſts chiefly of pinus abies, picea, limbra, and larix, tilia europea, betula alba, and ſalix caprea, and ſome unknown kinds of wood: and, according to Cateſby's Nat. Hiſt. of Carolina, great quantities of theſe enumerated woods are found floating down the rivers of Virginia and Carolina; and another part ſeems to come round the north of Europe from the Siberian rivers.

* Pinus abies, Linn. † Salix caprea, Linn.

ſorts of red-wood, which are called *rauda grene* and *ſtaffaejk* in Iceland, and on account of their colour and hardneſs are employed in various kinds of neat work. It comes moſt probably from the northern parts of Tartary, and partly from Virginia and Carolina. As to what relates to agriculture, it may be diſcovered by many paſſages of the antient Icelandic accounts, that corn formerly grew in Iceland. In later times ſeveral trials have been made with it, but they have been attended with little ſucceſs.

Governor Thodal ſowed a little barley in 1772, which grew very briſkly; but a ſhort time before it was to be reaped, a violent ſtorm ſo utterly deſtroyed it, that only a few grains were found ſcattered about.

If we conſider, beſides theſe ſtrong winds, or rather hurricanes, the froſts which frequently ſet in during May and June, we ſhall diſcover a number of difficulties that check the progreſs of agriculture in Iceland. If, notwithſtanding theſe obſtacles, it

can

can ever be brought to a thriving condition, it muſt certainly be under the preſent indefatigable governor, who has the welfare of the country much at heart, and, in conjunction with the government, ſtudies every poſſible means to promote it.

I conſider theſe violent winds, and the Greenland floating-ice, which every year does great damage to the country, as the chief cauſe of the diminution of the growth of wood, as well as of the ill ſucceſs in the late attempts for introducing agriculture.

This ice comes on by degrees, always with an eaſterly wind, and frequently in ſuch quantities, as to fill up all the gulphs on the north-weſt ſide of the iſland, and even covers the ſea as far as the eye can reach; it alſo ſometimes drives to other ſhores. It generally comes in January, and goes away in March. Sometimes it only reaches the land in April, and remaining there a long time, does an incredible deal of miſchief. It conſiſts partly of mountains of ice (*fiall jakar*) that are ſometimes ſixty fathoms high

high above water, and announce their arrival by a great noiſe, and partly of field-ice (*hellu-is*) of the depth of one or even two fathoms. Of this laſt ſome parts ſoon melt, and other parts remain undiſſolved many months, often producing very dangerous effects to the country *.

The ice cauſed ſo violent a cold in 1753 and 1754, that horſes and ſheep dropped down dead on account of it, as well as for want of food; horſes

* The immenſe maſſes of ice that are ſo dreadful, and affect the climate of the country along the northern and northweſt coaſt of Iceland, arrive commonly with a N.W. or N.N.W. wind from Greenland. The field-ice is of two or three fathoms thickneſs, is ſeparated by the winds, and leſs dreaded than the rock or mountain ice, which is often ſeen fifty and more feet above water, and is at leaſt nine times the ſame depth below water: theſe immenſe maſſes of ice are frequently left in ſhoal water, fixed, as it were, to the ground, and in that ſtate remain many months, nay years, undiſſolved, chilling all the ambient part of the atmoſphere for many miles round. When many ſuch lofty and bulky maſſes of ice are floating together, the wood that is often drifted along between them is ſo much chafed, and preſſed with ſuch violence together, that it takes fire; which circumſtance has occaſioned fabulous accounts of the ice being in flames: of the bulk of ſuch ice-maſſes, ſee Forſter's Obſervations made during a voyage round the world, p. 69, 1773 and 1774.

were obſerved to feed upon dead cattle, and the ſheep eat of each others wool. In the year 1755, towards the end of the month of May, in one night the ice was one inch and five lines thick. In the year 1756, on the 26th of June, ſnow fell to the depth of a yard, and continued falling through the whole months of July and Auguſt. In the year following it froze very hard towards the end of May and the beginning of June in the ſouth part of the iſland, which occaſioned a great ſcarcity of graſs, inſomuch that the inhabitants had little or no fodder the enſuing winter for their cattle: theſe froſts are generally followed by a famine, many examples of which are to be found in the Icelandic chronicles *.

Beſides

* The cold ſeems to have become more intenſe in Iceland ſince the time when theſe before-mentioned fir-trees were growing, and before the ocean was ſo very much covered with floating ice.

Theſe facts ſeem to confirm very much the opinion of count Buffon; in conſequence of which he believes, that the country towards the poles was formerly more habitable than it is at preſent: he is of opinion, that the ſkeletons of elephants found far north in Siberia, are almoſt irrefragable proofs of the formerly milder

Beſides theſe calamities, a number of bears yearly arrive with the ice, which commit great ravages, particularly among the ſheep. The Icelanders attempt to deſtroy theſe intruders as ſoon as they get ſight of them; and ſometimes they aſſemble together, and drive them back to the ice, with which they often float off again. For want of fire-arms they are obliged to make uſe of ſpears on theſe occaſions. The government itſelf takes every poſſible method to encourage the natives to deſtroy theſe animals, by paying a premium of ten dollars

milder temperature of the air; ſince they could ſcarcely be found in Siberia in ſuch numbers unleſs they had exiſted there. Buffon Epoques de la Nature, p. 165, & ſeq. The eaſtern ſhores of Greenland were formerly inhabited by a colony of Norwegians, and they had there a biſhop's ſee, called Gardar, to which belonged farms, woods, paſtures for cattle, granges, and tillage-land. See Crantz's Hiſtory of Greenland, vol. I. p. 245, which evidently proves the mildneſs of theſe now inhoſpitable regions. Ships ſailed formerly to the eaſtern coaſt; whereas for a great number of years paſt it has been inacceſſible on account of the immenſe maſſes of ice found there. Are Frode in Scheda Iſlandia, Oxon. 1716, cap. 2, p. 10, ſays, That at the firſt landing of the Norwegian coloniſts, Iceland was covered with woods and foreſts in the ſpace beween the ſhores and mountains.

for every bear that is killed, and by purchaſing the ſkin of the man who killed it. Theſe ſkins are a prerogative of the king, and are not allowed to be ſold to any other perſon.

It is as abſurd to ſuppoſe, that this floating ice conſiſts principally of ſaltpetre, as that it might be employed in making gun-powder; and yet there are ſome perſons who pretend to ſupport this opinion; but they are certainly undeſerving the trouble of refutation.

I muſt mention two other inconveniencies to which Iceland is ſubject, the *Skrida* and *Snioflod:* the name of the firſt imports large pieces of a mountain tumbling down, and deſtroying the lands and houſes that lie at the foot of it. This happened in 1554, when the whole farm of Skideſtedr in Vatndal was ruined, and thirteen people buried alive: the other ſignifies the effects of a prodigious quantity of ſnow, that covers the tops of the mountains, which rolling down in immenſe maſſes does a great deal of damage. There was an inſtance of this in the year

year 1699, during the night, when two farms, in the ſyſſel of Kioſar, were buried in the ſnow, with all their inhabitants and cattle *.

The climate is not unwholſome, as the uſual heat is not extreme, nor the cold in general very rigorous. However, there are examples of the mercury in Fahrenheit's thermometer falling quite down into the bulb, which is 24 degrees under the freezing point; when at other times it has roſe to 104 degrees.

It cannot be determined with any degree of certainty how much the cold has increaſed or decreaſed prior to 1749, the year when Horrebow began his obſervations on the weather; they were afterwards continued by the provoſt Gudlaug Thorgeirſſon to the year 1769: ſince which period obſervations have been made by Mr. Eyolfr Jonſon, who was formerly aſſiſt-

* Snioflod, or Snowflood, is a very expreſſive word for this dreadful accident, which is not uncommon in all alpine countries, eſpecially Switzerland. The Italians call ſuch a rolling down of maſſes of ſnow, Lavine; the French, Laivaches; and the Germans, Lauihnen.

ant at the Round Tower at Copenhagen, and receives a ſalary as firſt obſerver in Iceland *. His obſervatory is at Arnarhol near Reykarwik; and what is remarkable, he makes uſe of a teleſcope of his own conſtruction, made of the black Iceland agate, inſtead of coloured glaſs.

Lightening and thunder ſtorms are rare, and both in ſummer and winter ſeldom happen any-where elſe but in the neighbourhood of volcanoes. Northern lights frequently appear uncommonly ſtrong †. Sometimes a kind of the ignis fatuus is obſerved (*Snod-lios* and *hrævar-eldur*) that attaches itſelf to men and beaſts.

Among other aërial phenomena, the lunar halo (*roſabaugur*) which

* This ingenious gentleman died in 1775, not many months ſince the writing of this letter.

† The northern lights appear in Iceland in all the different quarters of the compaſs, eſpecially on the ſoutherly horizon, where a dark ſegment appears, from whence ſtrong columns of light dart forth. They are moſt frequently ſeen in dry weather, though there are inſtances of their appearance before, during, and after a ſhower of rain. The lights are often ſeen tinged with yellow, green, and purple. See Eggert Olaſſen and Biarne Povelſen's Travels through Iceland, ſec. 855.

prog-

prognoſticates bad weather, likewiſe deſerves a place here, as well as parhelions (*hia ſolar*) that appear ſometimes from one to nine in number *. Fire-balls (called *Viga Knottur*) are likewiſe obſerved, and when they are oval are named *Wiigabrandur*; and laſt of all comets, or *Haleſtiernor*, which are often mentioned in their chronicles.

The ebb and flood here, which the Icelanders call *flod* and *fiara*, are perfectly the ſame as at other places: they are ſtronger during the new and full moon than at other times, and ſtrongeſt of all about the equinoxes.

As I am here ſpeaking of the nature of the country, I cannot paſs over in ſilence the earthquakes that often happen, particularly before volcanic eruptions. In September, in the year 1755, fifteen violent ſhocks were ob-

* The parhelions are obſerved in Iceland chiefly at the approach of the Greenland ice, when an intenſe degree of cold is produced, and the frozen vapours fill the air: there are many inſtances which prove, that, under ſuch circumſtances, the ſun never appears without ſhewing one or ſeveral parhelions, and often a rainbow on the oppoſite ſide.

ſerved within a few days; and it is not uncommon to ſee whole farms overturned by them, and large mountains burſt aſunder, as will be remarked hereafter in the letter which treats of the conflagrations in Iceland.

In ſo mountainous a country, where there is no agriculture, and no commerce, except that carried on by bartering of the various commodities on the arrival of the Daniſh ſhips, no good roads can be expected: they therefore make uſe of neither carts nor ſledges; and there are many places in which it is both difficult and dangerous even to ride on horſeback, that have cauſed the names of *Oſœrur*, *Halſavegur*, *Hofdabrecka*, *Illaklif*, &c. to be given to ſome roads. Their length is not reckoned by the number of miles, but that of *thingmanna-leid*, that is, as far as a man, who is travelling to a place where juſtice is adminiſtered, can go in one day, which is about three and a half Swediſh, or four Icelandic miles *. Formerly houſes were

* About twenty or twenty-one Engliſh miles.

built

built in ſome particular places for the uſe of travellers, that were called *Thiodbrautar-ſkaala*; but now the churches are every-where made uſe of for this purpoſe.

When the Icelanders travel to ſea-ports to exchange their fiſh, &c. they have twenty, thirty, and ſometimes a greater number of horſes with them, which carry a load of 300 or 400 pounds weight each: but they have always ſome ſpare horſes along with them to relieve thoſe that are fatigued: this cavalcade is called *Leſt*, and the man who guides them is called *Leſtamadur*; he rides on before, accompanied with a dog, that, by uttering a certain word, drives the ſtrayed or ſtraggling horſes into the right road. They never carry any food for their horſes, as paſture is plenty every where.

The number of the inhabitants is by no means adequate to the extent of the country. It has been much larger in former times; but beſides what is called the *Digerdeath*, and other contagious diſeaſes, among which the plague

plague carried off great numbers from 1402 to 1404, many places have been entirely depopulated by famine. In the years 1707 and 1708, the ſmall-pox deſtroyed 16,000 perſons; ſo that the number of inhabitants cannot exceed 60,000.

LETTER

LETTER IV.

To Chevalier IHRE.

Of the Arrival of the Norwegians; the Government, and Laws in Iceland.

Stockholm, June 13, 1774.

AS I have treated in my former letter of the nature of the country in Iceland, an enquiry how, and when it was firſt peopled, might not perhaps be diſagreeable to you.

We know very little of the primitive inhabitants of Iceland, who poſſeſſed the country when the Norwegians firſt landed there. We are informed by ſome, that they were Chriſtians, who, according to the moſt probable conjectures, arrived there from England and Ireland, and were called *Papa* by the Norwegians *. They pretend to

* The antient Norwegians, who firſt landed in Iceland, found there inhabitants who were Chriſtians, and were called by the Norwegians *Papas*, which is conjectured to ſignify prieſts. This is confirmed by the preface of the Landnama Bok, or Book of Coloni-

zation,

to affirm, with the greateſt certainty, that this Engliſh colony ſettled there in the beginning of the fifth century; but I look upon it as the ſafeſt way not to enter at all upon an affair wrapped up in ſuch obſcurity. There is notwithſtanding reaſon to ſuppoſe that the Engliſh and Iriſh were acquainted with this country under another name

zation, written by various authors, the firſt of whom was Are Forde, born 1068; and he expreſsly ſays, in the firſt chapter of the book, that Iceland was ſettled by the Norwegians in the time of Alfred king of England, and of Edward his ſon. The ſame preface mentions, that Beda ſpeaks of Iceland under the name of Thyle, more than a hundred years before the arrival of the Norwegians in Iceland; and that the Norwegians found there Iriſh books, bells, and croſiers, which proved that theſe people came from the weſt. And it is added, that the Engliſh books mention an intercourſe of navigation between theſe lands about thoſe times. King Alfred certainly mentions in his tranſlation of Oroſius, the utmoſt land to the N.W. of Iceland, called Thila; and that it is known to few on account of its great diſtance. See Alfred's Oroſius, p. 31. The Landnama Bok was publiſhed at Copenhagen, 1774, in 4to. The circumſtance of the Iriſh books left in Iceland is likewiſe mentioned by the ſame Are Forde, in Ara Multiſcii Schedis de Iſlandia, Oxoniæ, 1716, 8vo, cap. ii. page 10, who ſays, they choſe not to live with the heathens, and for that reaſon went away, leaving behind Iriſh books, bells, and croſiers.

long

long before the arrival of the Norwegians; for the celebrated Beda in his time pretty accurately deſcribes it. But I will not dwell upon theſe antient inhabitants of Iceland, but proceed to examine how the Norwegians came to ſettle there. Of this we have ſeveral accounts in the Icelandic Sagas *. I ſhall particularly follow Landnama Bok, that treats of the arrival of theſe new coloniſts.

Naddoddr, a famous pirate, was driven by the winds on the coaſt of Iceland, on his return from Norway to the Ferro Gales, in 861, and named the country *Snio-land* (Snow-land) on account of the great quantity of ſnow with which he ſaw the mountains covered. He did not remain there long; but however extolled the country ſo much after his return, that one Gardar Suafarſſon, an enterprizing Swede, was encouraged by his account to

* The word Saga ſignifies the antient hiſtorical monuments in Iceland; ſome of them are the hiſtorical relations, others are fabulous ſtories in the ſtyle of the Arabian Nights. The diſtinction between them requires a nice critical judgment. As the word occurs often, we once for all explain it here.

go

go in ſearch of it in 864. He ſailed quite round the iſland, and then called it *Gardarſholmur* (Gardar's Iſland). He remained the whole winter in Iceland, and in ſpring returned to Norway, where he deſcribed the new-diſcovered iſland as a pleaſant, well-wooded country. This excited a deſire in Floke, another Swede, and the greateſt navigator of his time, to undertake a voyage thither. As the compaſs (in Icelandic *Leitharſtein* *) was not then known, he took three ravens on board, to employ them on the diſcovery. By the way he viſited his friends at Ferro; and after having ſailed farther to the northward, he let fly one of his ravens, which returned to Ferro. Some time after he diſmiſſed the ſecond, which alſo re-

* The word *Leitharſtein* is certainly equivalent to the Engliſh word Loadſtone, and probably has the ſame origin. The Anglo Saxon word Lædan ſignifies to lead; and the magnet, being the leader of the navigator, it is very evident that the loadſtone is the leading ſtone of the ſhip. The hiſtory of the three ravens is moſt evidently copied from the hiſtory of the deluge in Geneſis. However it proves an uncommon ſagacity in the navigator, who made uſe of birds for the firſt diſcovery of land.

turned to the ſhip again, as he could find no land. The laſt trial proved more ſucceſsful, ſince the third raven took his flight to Iceland; ſoon after they diſcovered land, and in a few days really arrived there. Floke ſtayed here the whole winter with his company; and becauſe he found a great deal of floating ice on the north ſide, he gave the name of Iceland to the country, which it has ever ſince retained.

When they returned to Norway in the following ſummer, Floke, and thoſe that had been with him, made a very different deſcription of the country. If on the one ſide Floke deſcribed it as a wretched place, Thorulfr (one of his companions in the voyage) on the other ſide ſo highly praiſed it, that he affirmed butter dropped from every plant, which gained him the nick-name of Thorulfr Smior, or Butter Thorulfr *.

* The expreſſion that Thorulfr made uſe of in deſcribing the fertility and richneſs of the country, characterizes the genius and manners of the age he lived in, and is therefore not to be overlooked in this account. Theſe minute ſtrokes paint the character and ſimplicity of the age; and, when compared with our manners, ſet them off in the faireſt point of view.

After

After what I have related, there are no traces of any voyage to Iceland, till Ingolfr and his friend Leifr undertook one in 874. They found on their arrival that the country had not been misrepresented; and resolved, after having spent the winter on the island, to settle there entirely for the future. Ingolfr returned to Norway, to provide whatever might be necessary to accomplish a new and comfortable establishment in an unfertilized and dreary country; and Leifr in the meanwhile went to assist in the war in England. After an interval of four years, they met again in Iceland, the one bringing with him a considerable number of people, with the necessary tools and implements for making the country habitable; and the other imported his acquired treasures. Since this period many people went there to settle, and in sixty years time the whole island was inhabited; and king Harold, who did not contribute a little towards it by his tyrannical treatment of the petty kings and lords in Normandy, was at last obliged to issue an order,

order, that no one ſhould ſail from Norway to Iceland, without paying four ounces of fine ſilver to the king, in order to put a ſtop, in ſome meaſure, to thoſe continual emigrations which weakened his kingdom,

Though the greateſt part of the inhabitants came from Norway, there are however many Danes and Swedes among them. Of the latter I will only mention the following, from that edition of Landnama Bok, which was printed at Skallholt. Ingimundur, an earl in the Gothic empire, one of the deſcendants of Bore, Gore's brother, p. 90; with his friends Jorundr, Ejvindr Sorkver, Aſmundr, and Hvatefridleifr; and his ſlaves Fridmundr, Bodvar, Thorer Reſſkegg, and Ulfkell, p. 90: Thordur, deſcended by the father's ſide in the fifth degree from Ragnar Lodbrock, p. 102: Thordur Knappur, natural ſon of Biorns of Haga; and Nafar Helge, p. 104: Bruni Hin Hviti, ſon of Hareks, earl of Upland, p. 104: Thormodur Hin Rami, p. 105: Biorn Rolfſon of the blood royal, p. 105:

Helgi Hin Magri, p. 107: Thorir Snepill, a ſon of Joruns, daughter of the Lagman Thorgnys, p. 117; and Gardarſuafarſon. Beſides theſe, Are Frode mentions one of the name of Olafr, who was of the ſame family as king Harold; another of the name of Hrollangur, brother of Rolfs firſt duke of Normandy, who drew his origin from the Swediſh king Gore, grandfather of Gylfe.

Torfæus mentions one Bodvar, a Swede, who ſettled in Iceland, and was deſcendant of the princeſs Goja, ſiſter of Gore: Floke, who gave to the iſland its preſent name of Iceland, was deſcended from the ſame family. Dalin, in his preface to the firſt volume of his Swediſh hiſtory, likewiſe mentions, out of Peringſkold and Biorner, the following: Snobjorn, Biorn Oſtrane, Grim, Orm Wedorm, Biorn, and Grimkill, with their mother Helga, daughter of Harold, Barder Snefallſas, Barder Wiking, Brimle, Hielm, Gote, Skolder Svenſke, Glamer, Wafur Helge, and Slâttubjorn.

As often as a new colony arrived there, the principal perſon in the company appropriated to himſelf as large a part of the country as he was able to occupy, and gave up as much of it as he thought fit to his companions, whoſe chief he was, bearing the title of Godi. But in a period when robberies and violence, by ſea and land, were conſidered as valour and merit, peace could not long ſubſiſt between the neighbouring leaders. There are every where inſtances to be met with in the Icelandic Sagas of battles between the new and original ſettlers. To prevent theſe conflicts in future, a perſon was choſen in the year 928, with the title of Lang-ſaugumadur, and great power and dignity conferred upon him. This man was the ſpeaker in all their public deliberations, pronounced ſentence in difficult and intricate caſes, decided all diſputes, and publiſhed new laws after they had been received and approved of by the people at large; but he had no power to make laws without the approbation and conſent of the

reſt. He therefore aſſembled the chiefs whenever the circumſtances ſeemed to require it; and after they had deliberated among themſelves, he repreſented the opinion of the majority to the people, whoſe aſſent was neceſſary before it could be conſidered as a law. His authority among the chiefs and leaders was however inconſiderable, as he was choſen by them, and retained his place no longer than whilſt he had the good fortune to preſerve their confidence.

Their firſt form of government was conſequently a mixture of ariſtocracy and democracy; but all the regulations made by it were inſufficient to maintain order among ſo many chiefs, who, though all of the ſame rank, were differently inclined, and unequal in power. Nothing was therefore more frequent than rapine and violation of the laws. They openly made war againſt one another, examples of which are to be met with in the Sturlunga Saga, where, it is ſaid, twenty veſſels carrying 1300 men, had a bloody engage-

ment

ment, which ſo weakened the contending parties, that their whole power at laſt became an eaſy prey to a few arbitrary and enterprizing men, who, as is too generally the caſe, wantonly abuſed it, to the oppreſſon of their countrymen, and the diſgrace of humanity *.

Notwithſtanding all theſe inteſtine troubles, they remained entirely free from the Norwegian yoke; though the kings of that country, ſince the time of Harold Harfagers, viewed this new and powerful republic with envious eyes, which, though now ſeparated, owed its origin to them; but at laſt they experienced that fate, which is almoſt always inevitable, wherever liberty degenerates into licentiouſneſs, and public ſpirit into ſelfiſh views; that is, they were obliged to ſubmit to one chief. The greateſt part of the inhabitants in 1261, put themſelves under the protection of king Hakan, and promiſed to pay tribute

* The account of the origin of the Icelandic republic is a curious and intereſting circumſtance for the hiſtory of humanity; the ſame muſt be ſaid of the inteſtine feuds which gave an opportunity to the Norwegian kings to eſtabliſh their authority over this once free nation.

to him on certain conditions agreed upon between them, and the reſt followed their example in 1264. Afterwards Iceland, together with Norway, became ſubject to the crown of Denmark, who intruſted the care of it to a governor, that commonly went there only once a year to examine every thing, though, according to his inſtructions, he ought to have reſided there. As the country ſuffered incredibly through the abſence of its commanders, it was reſolved a few years ago, that the governor ſhould reſide there continually, and have his ſeat at Beſſeſtedr, one of the royal domains, where old Snorre Sturleſon formerly dwelt. He has under him a bailiff, two lagmen, a ſheriff, and twenty-one *ſyſſelmen* *. Formerly the country was

* The place of *Amtman* is here tranſlated Bailiff, and is to be taken in the ſenſe in which the French receive the word *Bailiff*, i. e. the head of a Bailiwick. The word *Lagman* ſignifies properly a Lawman; i. e. a perſon who adminiſters juſtice, and might be tranſlated Judge or Juſtice. The *Landvogt* is the perſon who adminiſters the executive power of juſtice and the criminal law; and he may be compared to a ſheriff. The *Syſſelmen* are the magiſtrates of the ſmaller diſtricts in Iceland (called the *Syſſel*) who not only act as juſtices of the peace, but alſo as rece ivers

was divided into quarters (*Fiordungar*) each having its own court of juſtice, of which one was formed of their public aſſemblies, under the denomination of *Fiordungs-doeme* *. But as the public ſecurity ſeemed to require a ſuperior court of judicature, to which the ſuffering party might appeal, a *Fimtar-doeme* was eſtabliſhed ſoon after the introduction of the Chriſtian religion, which tribunal conſiſted of the four above-mentioned courts, and ſome clergymen.

receivers of the land-tax. The governor is called in Iceland *Stifts-amtman*, which is the ſame as a bailiff of the epiſcopal dioceſe; i. e. the chief magiſtrate of the iſland. This place was occupied in 1772 by Mr. Thodal, counſellor of juſtice, who had been employed in the final adjuſtment of the limits between Sweden and Norway; his ſalary amounted to 1500 rix-dollars. Travellers praiſe his abilities, patriotiſm, and hoſpitality. The bailiff at the time of our arrival in Iceland was Mr. Olafr Stephanſſon, a native of Iceland, whoſe parts and abilities we admired, and whoſe hoſpitality we experienced; his ſalary is 400 rix-dollars; and the ſame appointment is given to the ſheriff (*Landvogt*) Mr. Skule Magnuſen, who is ſaid to deſerve well of his country for his patriotiſm and eminent ſervices.

* The words *Fiordungs-doeme* and *Fimtar-doeme* are ſtill in part preſerved in the language. For *Doomſday* is the day of judgment, from the Gothic word *Doem*, to judge, with which the Engliſh word Doom correſponds.

At preſent all cauſes are firſt decided at the *Harads-thing*, or county court, from which the parties concerned may appeal to the *Al-thing*, or common court of juſtice, which is kept every year on the 8th of July at Thingvalla. Here there are two courts, the one before which the cauſe in appeal is firſt brought, and conſiſts entirely of *lagmen* *; the other to which recourſe may be had for a new hearing, and more accurate examination the following year; and this is compoſed of the governor, who preſides, and twelve aſſeſſors, who are the moſt reſpectable men in the country, moſtly *lagmen* and *ſyſſelmen*. From this court the parties may again appeal to the ſupreme court of judicature at Copenhagen, which is final.

The Norwegians, on their firſt arrival in Iceland, made their own laws; but theſe proving inſufficient, when the number of people increaſed, Ulfliotr undertook, in the year 987, a

* At the ſame time and at the ſame place the ſpiritual court called *Preſta-ſtefna* is held, wherein the governor and biſhop preſide: the prieſts are the aſſeſſors.

voyage

voyage to Norway, and compoſed an accurate code of laws from the regulations eſtabliſhed there. He made uſe of the *Gulothing* law on this occaſion, and returned to his native country after an abſence of three years.

In 1118, the *Gragas*, a famous ancient code of laws, was received there; and in 1280, that called the *Jonsbok**, according to which ſentence is ſtill pronounced in ſome caſes; but at preſent moſt matters are decided after the Daniſh law, and ſome more recent regulations.

* The *Jonſbok* was received in 1272, according to an Icelandic Chronicle, publiſhed by Langebeck in the ſecond volume of the Scriptores Hiſt. Dan.

LETTER

LETTER V.

To Chevalier IHRE.

Concerning Eccleſiaſtical Affairs in Iceland.

Stockholm, June 22, 1772.

IT is known from the Landnama Bok, and the Ara-Schedis, that the Norwegians found ſome traces of Chriſtianity on their arrival in Iceland. There were alſo ſome few Chriſtians among theſe new coloniſts, who, however, ſoon apoſtatized to the heathen religion, ſo that it became general there. It is not known whether any attempts had been made to introduce the Chriſtian religion before the year 981, when a certain biſhop Friedric arrived there from Saxony, and was obliged to return, after a ſtay of five years, without having made any great progreſs.

However, a church was built in 984, by Thorvard Bodvarſſon, and ſome perſons

perſons received baptiſm; but others, though they had no objection to the Chriſtian doctrine, could not be prevailed upon to ſuffer themſelves to be baptized, as they pretended it would be indecent to go naked into the water like little boys to receive baptiſm, which, according to the cuſtom of thoſe times, could only be done by ſubmerſion. Some, however, to ſhew their deteſtation of paganiſm, ſuffered themſelves to be ſigned with the croſs, which they called *Primſigning*. Theſe were not conſidered either as Chriſtians or Heathens; however, they were allowed to eat with the former, and to be buried cloſe to the church-yard.

Olof Tryggvaſſon afterwards ſent them Stefr Thorgilſſon, and after him his chaplain Thangbrand, a German by birth; but they were both received with ſtones and abuſive language, as they attempted to convert them, which happened to be at the very ſpot where the common court of juſtice was held: nor were they ſpared by the poets of the country, who, being bribed for the purpoſe, poured forth in their poetical

poetical productions the keeneſt invectives and ſatire upon theſe champions of the Chriſtian religion.

However, the Icelanders obtained ſome knowledge of the Chriſtian doctrine, which by degrees operated upon their minds. Some of them refuſed to contribute any more towards the idolatrous ſacrifices, and wiſhed to enjoy more circumſtantial and certain inſtruction in the Chriſtian religion; ſo that on the arrival of Giſſur and Hjalti in the year 1000, the whole country was converted without bloodſhed, tho' not without oppoſition. They alſo obtained a jus canonicum from biſhop Grimkell *, drawn up by himſelf, which was as valid as a law till 1123, when it was again reviſed by biſhops Thorlak and Ketill †.

After this time monks and convents abounded in the country. Many monks of the order of St. Benedict and St. Auſtin ſettled there, and the people paid a tribute to the Roman ſee,

* See Kriſtnis Saga, printed at Copenhagen, 1776, in 8vo. p. 57.

† The canon law was printed at Copenhagen, 1776, in 8vo.

as

as well as other European nations, which conſiſted in one *nagli*, ten of which were equal to one ell of two feet *.

That Rome did not loſe ſight of Iceland, though ever ſo diſtant, can be proved by the biſhop of Skallholt, Arne Thorlakſon, keeping his own agent, Sighvatr Lande, canon of Drontheim, at the ſecond council of Lyons, which was convened by Gregory I. in the year 1274; and that the Icelanders did not yield in zeal to their fellow Chriſtians, appears by the willingneſs with which they contributed both men and money to the cruſades that were then in faſhion.

Amongſt other ſaints, the biſhop of Hoolum, John Ogmundſſon, and the biſhop of Skallholt, Thorlak Thorhallſſon, were worſhipped: the laſt died in 1193, and though he was not canonized by any pope, yet he found

* The value of all things is ſettled in Iceland by ells of *wadmal*, which is a coarſe woollen ſtuff of their own manufacturing: the ſee of Rome taxed every man in Iceland as high as the value of ten ells of *wadmal*.

worſhippers

worſhippers in Iceland *, Denmark, Norway, England, Scotland, the Orkneys, the Ferro iſlands, and in Greenland, and even had a church dedicated to him in Conſtantinople. His Saga is full of miracles, ſaid to have been wrought by him. It was unanimouſly agreed, that the tenth of January, the day on which he died, and the third of July, when he was elected biſhop, ſhould both be annually celebrated. His body was taken out of the grave on the thirteenth of Auguſt 1198, and put into a coffin plated with gold and ſilver; and it was reſolved to keep this day alſo as a feſtival. The proteſtant biſhop Giſſur Ejnarſſon, afterwards, from a miſtaken zeal, cauſed the precious ornaments with which the box was adorned to be broken off, and had it covered with copper gilt, and it is ſtill preſerved in

* Biſhop Finnſen in his Eccleſiaſtical Hiſtory mentions (vol. 1. p. 298, note b.), That biſhop Thorlak had been likewiſe worſhipped as a ſaint in Sweden, but there are no veſtiges of this found in the old Swediſh Calendars. The tenth of January is conſecrated to Paulus Eremita, and Auguſt the thirteenth to Hippolitus and Lociis Martii.

the church of Skallholt, as a piece of antiquity. In the year 1715, biſhop John Widalin ordered the pretended relique to be buried, and only a bit of his ſkull is ſhewn, which, however, if cloſely examined, will be found to be neither more nor leſs than a piece of cocoa-ſhell. Arcimboldus, ſo famous in the north for his ſale of indulgences, was much too attentive to his intereſt to have neglected Iceland. In 1517 he had his own agent there, who was, however, more coldly received by biſhop Stephen Jonſſon than he expected.

The Icelanders firſt received their own biſhops in the year 1057 at Skallholt, and at Hoolum in 1107. They were originally under the juriſdiction of the archbiſhop of Bremen and Hamburgh; but in the year 1103 or 4, they became ſubordinate to Azerus *, firſt archbiſhop of Lund in Scania, and in 1152 to the biſhop of Drontheim. The Icelanders preſerve the memory of their prelates both in their

* In the Icelandic annals he is commonly called *Auſſur*.

annual

annual regiſters, and in their Sagas, which particularly deſerves attention, ſince the actions of many worthy men are alſo found recorded therein. I ſhall mention the deplorable end of one of their biſhops, John Jerechini *, by birth a Dane, who, from provoſt and electus of Weſteras, was appointed archbiſhop of Upſal, by king Erich Pommeroffn in 1409. In this exalted ſituation he behaved ſo ill that he was obliged to fly to Denmark in 1419: from whence, according to the account of the Icelandic regiſters, he made the beſt of his way to England, and from thence took his paſſage for Iceland, where he did not arrive till the year 1430. He was received by the inhabitants with open arms, and appointed to the ſee of Skallholt, which had been vacant eleven years. But here alſo he diſcovered ſo much pride and ſelfiſhneſs, that ſome of the principal perſons in the country entered into a conſpiracy, and when he was celebrating maſs in

* The Icelandic annals call him Jon Geirreckſſon.

the cathedral church, on the thirteenth of Auguſt 1433, in commemoration of St. Thorlak, they took him by force from the altar, ſtripped him of all his epiſcopal ornaments, and putting him into a ſack, with a large ſtone round his neck, threw him into the river Brüar, which runs by Skallholt, from whence his body was afterwards taken, and buried in the cathedral church *.

King Chriſtian III. began to introduce the Lutheran religion in the year 1540; but the zeal with which the biſhops (who were then very powerful) oppoſed him, prevented him from ſucceeding in it till the year 1551.

Since that period, the church of Iceland has enjoyed a happy tranquillity, every ſeed of diſcord being ſuppreſſed in its riſe, though ſome attempts were made to diſſeminate evil.

Iceland is divided into 189 pariſhes, of which 127 belong to the ſee of Skallholt, and 62 to that of Hoolum.

* This account will ſerve to correct what is erroneous in Rhyzelii Epiſcopoſcopia, where the typographical faults in Perinſköld's Monumenta Uplandica, vol. I. p. 155, have been copied. Vide Finn. Hiſt. Eccl. Iſlan. vol. II. p. 471.

All the miniſters are natives or Icelanders, and receive a yearly ſalary of 400 or 500 rix-dollars from the king, excluſive of what they have from their congregations,

LETER

LETTER VI.

To Chevalier IHRE.

Of the Character and Manner of Life of the Icelanders.

Stockholm, Sept. 1, 1774.

IN a former letter I treated of the arrival of the Norwegians in Iceland, of their firſt form of government, and the changes they experienced through their own miſmanagement and the viciſſitudes of time: give me leave, Sir, to draw now your attention to their character and way of life.

In like manner as their anceſtors lived only by war, piracy, the chace, and agriculture, ſo our new Icelandic coloniſts were ſtrangers to any fame but that acquired by the ſtrength of their arm, and knew no exerciſes but ſuch as a hardened body was able to ſupport.

To go to war, to plunder, burn, deſtroy, and ſurmount every obſtacle that oppoſed their deſigns, they deemed the ſureſt path to immortality; even their games gave them an opportunity of exerciſing their ſtrength as well as agility of body.

Glimu-liſt, or the art of wreſtling, was general among them; though it is mentioned in their old hiſtories, that their heroes ſometimes made uſe of an artifice which was called *Lauſe-tok*, and is the ſame as what we call tripping up the heels. *Skylmeſt*, or the art of fencing, was ſtill more common; for though they treated one another pretty roughly on theſe occaſions, yet thoſe rules of art were wanting which a weaker arm may at preſent apply to his advantage upon occaſion.

The *Manjafnadur* was held in the higheſt eſteem: a man dexterous in that exerciſe was held in the utmoſt veneration by them, and was celebrated even in their ſongs. This was a kind of ſingle combat, to which a man might challenge any one who was deſirou

ſirous to be recorded in the annals of fame. Life or death was alike indifferent to theſe combatants; and it was deemed a noble art to underſtand well how to ſharpen the inſtruments of death, as may be ſeen by *Rigſthulu*.

The ſituation in which the Icelanders were, in regard to the kings of Norway, who always kept a watchful eye over them, and ſought every opportunity to ſubjugate them, obliged them to have recourſe to other ſtates for a knowledge of government and literature. For this purpoſe they often ſailed to Norway, Denmark, Sweden, England, and Scotland. The travellers, at their return, were obliged to give an account to their chiefs of the ſtate of thoſe kingdoms through which they had paſſed. For this reaſon hiſtory, and what related to ſcience, was held in high repute, as long as the republican form of government laſted; and the great number of Sagas and hiſtories which are to be met with in the country, if not all equally important, ſhew at leaſt the deſire they had of being inſtructed.

During this time Greenland was diſcovered by an Icelander, Eyrek Rauda, in 932; and America in 1001, by Biorn Herjulfsſon and Leif Erichſſon.

To ſecure themſelves, therefore, againſt their powerful neighbours, they were obliged to enlarge their hiſtorical knowledge; they likewiſe took great pains in ſtudying perfectly their own laws, for the maintenance and protection of their internal ſecurity. Thus Iceland, at the time when ignorance and obſcurity pervaded the reſt of Europe, was enabled to produce a conſiderable number of poets and hiſtorians. When the Chriſtian religion was introduced there, more were found converſant in the law, than could have been expected, conſidering the extent of the country, and the number of its inhabitants. Fiſhing was followed among them; but they devoted their attention more conſiderably to agriculture*, which has ſince entirely ceaſed.

* Hans Finſſen, in his letter on the feaſibleneſs of agriculture in Iceland, Copenhagen, 1772, 8vo, demonſtrates this by a written document during the time of Snorre Sturleſon, pag. 64, which likewiſe appears from Landnama Bok, chap. 21.

Two things have principally contributed towards producing a great change both in their character and way of life, viz. the progreſs of the Chriſtian religion under Olof Trigg-waſſon, and the loſs of their liberty under king Harold. For if religion, on one ſide, commanded them to deſiſt from their ravages and warlike expeditions; the ſecular power, on the other, deprived them of the neceſſary forces for the execution of them; ſince this time we find no farther traces of their heroic deeds, except thoſe which are preſerved in their hiſtories. Our preſent Icelanders give the preference to fiſhing, and the care of their cattle, to war.

The Icelanders are middle-ſized and well-made, though not very ſtrong; and the women are in general ill-featured. The men have left off the cuſtom of wearing beards long ago, though you find them repreſented with beards in Eggert Olafsen's Travels through Iceland; a drawing which, perhaps, may repreſent an inhabitant of Sond-

moer, in Norway, but by no means an Icelander *.

Vices are indeed much leſs common among them than in other parts, where riches and luxury have corrupted the morals of the people. Theft is ſeldom heard of; nor are they inclined to incontinence, though there are examples of perſons having been puniſhed more than once on that account.

Though their poverty diſables them from imitating the hoſpitality of their anceſtors in all reſpects, yet the deſire of doing it ſtill exiſts: they cheerfully give away the little they have to ſpare, and expreſs the utmoſt joy and ſatisfaction if you are pleaſed with their gift. When they want to ſhew

* This, however, is ſubject to ſome exceptions; for the inhabitants of Omund Fiorden, and ſome families on the north ſide of the iſland, ſtill wear beards; and in Fniſkadal lives a man named Benedict, known on account of his beard. Between 1740 and 1750 it happened, between the icy mountains of Sneefaelds Jokne, that two brethren dividing between themſelves the inheritance left them by their father, one of them, called Helge, gave his brother four rix-dollars for the excluſive right of wearing a beard; which right, in their family, was the ſole prerogative of their late father.

themſelves particularly affectionate, they kiſs one another on the mouth on their viſits; they do the ſame to the huſband and the wife, the mother and the daughter: they are uncommonly obliging and faithful, and extremely attached to government *. They are very zealous in their religion †, and it muſt be owned not entirely free from ſuperſtition. They have an inexpreſſible attachment for their native country, and are no where ſo happy. An Icelander, therefore,

* To prevent ſmuggling, there is a ſevere penalty for piloting a ſtrange ſhip into harbour. When the philoſophic travellers made the coaſt, they were under neceſſity to force an Icelander to ſtay on board, and to ſerve them as a pilot. And though appeaſed by good treatment and preſents, he nevertheleſs carried the ſhip to an unſafe place, till the governor granted his leave to bring the ſhip to a ſafe anchorage. When the reaſon of this ſtrange behaviour was aſked, the Icelander anſwered, he would rather ſuffer himſelf to be cut in pieces, than to act againſt the regulations of his king. It is however told, that the inhabitants on the northern coaſt are not quite ſo docile, and therefore leſs obſequious.

† An Icelander never paſſes a river, or any other dangerous place, without previouſly taking off his hat, and imploring divine protection; and he is always thankful for the protection of God, when he has paſſed the danger.

rarely

rarely ſettles in Copenhagen, though ever ſo advantageous conditions ſhould be offered him *.

* It ſeems that Providence has wiſely inſtilled into the human heart the love of that ſoil whereon a man is born, and probably with a view that thoſe places, which are not favoured by nature with her choiceſt bleſſings, may not be left without inhabitants. It may be affirmed with ſome degree of certainty, that the love of ones native place increaſes in an inverſe ratio of its having received favours from nature. A Frenchman ſeldom or never feels that longing deſire for his home, which all Swedes are ſenſible of. A peaſant of Scania (a rich country in a mild climate) eats his haſty-pudding (the favourite diſh in Scania) with equal pleaſure and enjoyment in whatever place it be; but a native of Elfredhal and Sarna (places ill-favoured by nature) thinks his bread made of flour, mixed with the bark of trees, in his own country, more preferable to the beſt diſhes he eats in another. The chiefeſt wiſh of a Switzer is to die in his own country. When a Switzer in the French army ſung a certain ſong to his countrymen in the laſt war, there aroſe in the breaſts of all that heard him ſuch a diſeaſe-like longing for their native country, that it became abſolutely neceſſary to the French generals to give the ſtricteſt injunctions, that this ſong ſhould never be heard again in the camp. This will appear incredible to thoſe who are acquainted with no other happineſs than that which is produced by the enjoyment of affluence, luxury, and voluptuouſneſs. It always recalls to the memory that fine paſſage in Seneca: "Ulyſſes ad "Ithacæ ſuæ ſaxa properat, quemadmodum Agamem-"non ad Mycenarum nobiles muros; nemo enim pa-"triam amat, quia magna, ſed quia ſua."

On

On the other hand, one cannot aſcribe any great induſtry to them; they work on in the manner they are once uſed to, without thinking of uſeful improvements. Perhaps this defect lies more in the government, who, being unacquainted with the nature of the country, did not make the neceſſary diſpoſitions and regulations for creating and encouraging induſtry. They are not cheerful in converſation, but ſimple and credulous, and have no averſion to a bottle if they can find opportunity; but it may eaſily be conceived, that this is not to be underſtood of all without exception. When they meet together, their chief paſtime conſiſts in reading their hiſtory (*ſauguleſtur*); the maſter of the houſe begins, and the reſt continue in their turns when he is tired. Some of them know theſe ſtories by heart, others have them in print, and others have them in writing. One of theſe paſtimes is *rumuleſtur*, conſiſting in the reciting ſome verſes, that ſometimes are bad enough ſung. They beſides amuſe themſelves in their meetings

ings with what they call *wike-waka*, where a man and woman take one another by the hand, and by turns ſing ſtanzas, which are a kind of dialogue, and to which the company ſometimes join in chorus. This however affords little amuſement to a ſtranger, as they generally ſing very bad, without obſerving time, or any other grace, particularly as they have not the leaſt knowledge of the modern improvements in muſic *.

To their diverſions likewiſe belongs that called *glaeder*, where one among them is diſguiſed; *ringbrud*, where ten or twelve men join hands, and form a ring in dancing; and it is reckoned a great dexterity to break through the ring, without deſtroying their order; *glimu liſt*, which has been mentioned before, and means wreſtling; *hnatt leikur*, or playing with bowls on the

* I obſerved two kinds of muſical inſtruments in Iceland, one called *laang ſpil*, with ſix braſs ſtrings; the other called *fidla*, with two ſtrings made of horſes hair: both are played by a bow. I likewiſe heard of another inſtrument called *ſymphon*, but I never could get a ſight of it.

ice;

ice; *lyſtridin*, or riding races for a wager, &c.

They are famous for playing at cheſs, and had formerly two ſorts of this game; one of which was called *jung-fruſchach* (ladies cheſs) and the other *riddare ſchach* * (knights cheſs): at preſent only the laſt is common. They alſo amuſe themſelves with *kotra* (a game at tables) they play on it, *forkjerung* or *olofstafl*, when the table men are ranged blindfold, without dice, according to an old ſong that muſt be ſung by heart. Beſides theſe games they have others called *Milna*, *Faringar-tafl*, and *Goda-tafl*. They alſo play ſome games at cards, called *Alkort*, *Handkarrer*, *Truſpill*, and *Pamphile*; all theſe games are merely for amuſement, ſince they never play for money, which ſeems however to have been formerly a cuſtom among them; for in one of their old laws a fine is laid on thoſe who ſhould play for money.

* Vide letter of Arnus Magnal to Widalin, communicated to me in manuſcript by Mr. Thorotti.

LETTER

LETTER VII.

To Chevalier IHRE.

Of the Dreſs of the Icelanders.

Stockholm, Sept. 6, 1774.

THE Icelanders have made very few alterations, if any, in their dreſs in modern times. It is not elegant or ornamental; but yet neat, cleanly, and ſuited to the climate. The men all wear a linen ſhirt next to the ſkin, with a ſhort jacket, and wide pair of breeches over it. When they travel they wear another ſhort coat (*hempa*) over it. All this is made of coarſe black cloth (*wadmal*); only the inhabitants on the north ſide of Arnarfiord wear white cloaths. On the head they wear large three cornered hats, and on their feet worſted ſtockings and Icelandic ſhoes.

Some of them have ſhoes from Copenhagen, but as they are rather too dear

dear they generally make their own ſhoes, ſometimes of ox hide, but moſtly of ſheep's leather: the manner in which they make them is thus; they cut a ſquare piece of leather, rather wider than the length of the foot, this they ſow up at the toes, and behind at the heel, and tie it on with leather thongs. Theſe ſhoes are convenient enough where the country is level; but it would be very difficult for us, who are not uſed to them, to go amongſt the rocks and ſtones, though the Icelanders do it with great eaſe. I ſhall ſpeak of their fiſhing cloaths hereafter.

The women are likewiſe always dreſſed in black *wadmal*: they wear a bodice (*upphlutur*) over their ſhifts, which are ſewed up at the boſom; and above this a jacket laced before, with long narrow ſleeves reaching down to the wriſts. In the opening on the ſide of the ſleeve they have chaſed buttons, with a plate fixed to each button, on which the bridegroom, when he buys them, in order to preſent to his bride, takes care to have

his name and hers engraved. At the top of the jacket a little black collar is fixed (*ſtrutur*) of about three inches broad, of velvet or ſilk, and frequently trimmed with gold cord. The petticoat is likewiſe of *wadmal*, and reaches down to the ancles. Round the top of it is a girdle of ſilver, or ſome other metal, to which they faſten the apron (*ſvinta*), which is alſo of *wadmal*, and ornamented at top with chaſed buttons. Over this dreſs they wear a *hempa*, or upper dreſs, nearly reſembling that of the peaſants at Wingaker in Sweden, with this difference, that it is wider at bottom; this is cloſe at the neck and wriſts, and a hand's breadth ſhorter than the petticoat. It is adorned with a facing down to the very bottom, which looks like cut velvet, and is generally wove by the Icelandic women. On their fingers they wear many gold, ſilver, or braſs rings. Their head-dreſs conſiſts of ſeveral cloths wrapped round the head, almoſt as high again as the face; it is tied faſt with a ſilk handkerchief, and ſerves more for warmth than

than ornament: girls are not allowed to wear this head-dreſs before they are marriageable. At their weddings they are adorned in a very particular manner; the bride wears cloſe to the face, round her head-dreſs, a crown of ſilver gilt. She has two chains round her neck, one of which hangs down very low before, and the other reſts on her ſhoulders. Beſides theſe ſhe wears a leſſer chain on the neck, from which a heart generally hangs, which may be opened to put balſam or ſome other kind of perfume into it.

The dreſs here deſcribed is worn by all the Icelandic women, high and low, without exception; with this difference, that the poorer ſort have it of coarſe *wadmal*, with ornaments of braſs; and thoſe that are eaſier in their circumſtances of broad cloth, with ſilver ornaments gilt. I ſaw one of theſe dreſſes, which belonged to the bailiff's wife, and was worth at leaſt three hundred dollars. Perhaps it would not be diſagreeable to peruſe a liſt of the different articles which compoſe an Icelandic woman's dreſs,

one of which Mr. Banks bought, in order to take to England, with his other Icelandic collections.

	Rix Dol.	Shil. Dan.
Hempa (upper dreſs) —	4	0
Hættve (travelling hat) —	5	0
Upphlutur (bodice) —	2	24
Svinta (apron) — —	6	0
Treja (jacket) — —	4	0
Mallinda (girdle) —	6	0
Fat (petticoat) —	8	0
Kjedja (chain) — —	4	0
Laufa prionar (bodkins ornamented with ſilver)	6	0
Koffur (fillet) — —	2	0
Erma knappar (ſleeve-buttons)	1	24
Quen vetlingar (rough gloves)	0	46
Aubrcida (a cloth to wrap their cloaths in)	4	0

LETTER

LETTER VIII.

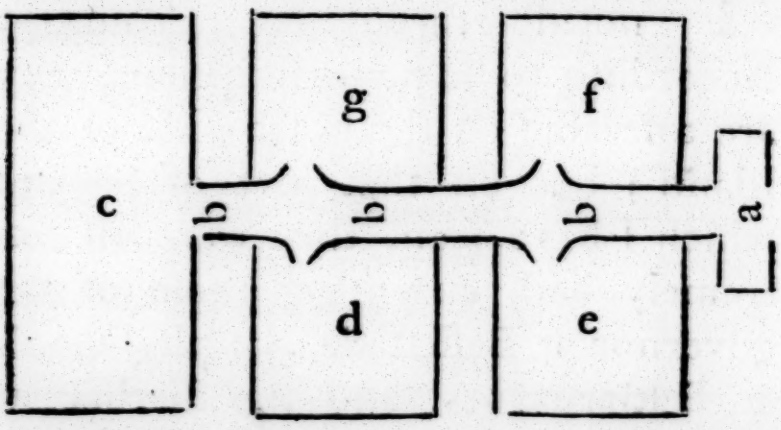
To Chevalier IHRE.

Of the Houſes and Buildings of the Icelanders.

Stockholm, Sept. 18, 1774.

THE houſes of the Icelanders are not alike throughout the country. According to ſome deſcriptions, they are tolerable on the north ſide of the Iſland; but on that part of Iceland which I have ſeen, they were all extremely bad, excepting thoſe of the governor at Beſſeſtedr, the phyſician's at Seltiarnarnes, and the ſheriffs at Wido, that were built of ſtone at the king's expence. In ſome parts the dwellings and other buildings of the Icelanders are made of drift-wood, in others they are raiſed of lava, almoſt in the ſame manner as the ſtone-walls we make for incloſures, with moſs ſtuffed between the lava. In ſome houſes the walls are wainſcotted

within. The roof is covered with ſods laid over rafters, or ſometimes over ribs of whales, which is both more durable and more expenſive than wood. The timber-work reſts on many beams laid length-ways. The walls are about three yards high, and the entrance ſomewhat lower. The plan of one of theſe houſes is here annexed, to give a better idea of it.



(a) is the door or entrance of the long lobby; (bbb) is about ſix feet broad, and admits the light through ſome holes in the roof, upon which a hoop, with a ſkin ſtretched over it, is laid. At the end of the lobby is a room (c) where the women do their work, and where the maſter of the houſe generally ſleeps with his wife.

The walls of this room are wainſcotted; it has a ceiling and floor, ſometimes even ſmall glaſs windows, but no fire-place. On both ſides of this long lobby are four rooms, two on each ſide, of which (d) is the kitchen, (e) the room made uſe of to eat in, (f) the dairy, and (g) the ſervants room: theſe rooms have neither ceilings nor floors, and the walls are ſeldom or never lined. The windows are made of the chorion (*liknarbelgur*) and amnios of ſheep (*vatzbelgur*) or the membranes which ſurround the womb of the ewe. Theſe are ſtretched over a hoop, and laid over an opening in the roof, upon which a wooden ſhutter is let down, if the weather be ſtormy. They have not even a chimney in the kitchens, but only lay their fuel on the earth between three ſtones, and the ſmoke iſſues from a ſquare hole in the roof. Beſides this houſe, they have a booth or ſhed to keep their fiſh in (*ſkæmma*) ſometimes another for their cloaths, &c. and not far off the ſtable for their cattle. In the poor ſort of houſes, they uſe the in-

ner membrane of the ſtomach of animals for the windows, and they call it *ſkœna*; but this is not ſo tranſparent as the above-mentioned membranes.

LETTER

LETTER IX.

To Mrs. CARLSON of Gothenburg.

Of the Food of the Icelanders.

Gothenburg, March 20.

THOUGH it cannot afford any great pleaſure to examine the manner in which the Icelanders prepare their food, particularly after having ſo lately taſted at your table all the dainties of the four parts of the globe; I will, nevertheleſs, perform my promiſe in communicating to you a deſcription of it. Methinks I ſee you ſometimes diſdaining their diſhes; but, I aſſure you, an Icelander is not leſs happy for being unable to ſeaſon his food with the productions of a diſtant climate: he is content with what nature affords him, ſatisfies the cravings of his ſtomach, and enjoys his health, whilſt we frequently ſurfeit ourſelves by feaſting on delicacies, and loath the moſt wholeſome food.

The larders and pantries of the Icelanders are ſeldom ſo well ſtored as to contain all the articles that I am going to mention at one time; ſome of them, however, they muſt abſolutely be provided with, as their food entirely conſiſts of them; and they are

Bread of ſeveral ſorts, chiefly ſour biſcuit * from Copenhagen; but they have not much of this, as it is too dear for them; they content themſelves therefore with providing it for weddings,

* In moſt northern countries the inhabitants live on rye bread; the flour taken to make it is ſeldom bolted, and it is commonly prepared with ſour ferment or leven, which gives the bread an acidulous taſte, diſagreeable, and reſiſting the ſtomachs of weak perſons, but palatable and wholeſome to thoſe of a ſtrong conſtitution. The ſour paſte communicates an agreeable acidity to this bread; and as the northern climates, on account of their long winters, and the confinement of people in heated rooms full of noxious effluvia, as well as on account of the ſalt-meat, the chief diet of the inhabitants, inclines the people to the ſcurvy; this acidulous bread, the ſour-crout, and in Ruſſia the ſour drink called *Guaſs*, afford ſuch powerful antiſeptics, that, with the diet here deſcribed, the ſcurvy ſeldom or ever gains ground among them. Theſe ſour biſcuits, no doubt, are likewiſe made of rye-flour, or of rye and wheat mixed together, ground without bolting, and rendered acidulous by fermentation with ſour leven.

and

and other entertainments. Some, inſtead of it, bake themſelves bread of rye-flour, though they likewiſe get ſome from Copenhagen. The manner in which they bake it is thus: the flour is mixed with ſome fermented whey (*ſyra*) and kneaded into dough, of which they make cakes half an ell in breadth, and three inches thick; theſe are boiled in water or whey, and then dried on a hot ſtone or an iron plate.

Flour of *Fiálgrás* (rock-graſs *) a caſk of which well cleaned and packed coſts a rix-dollar; it is firſt waſhed, and then cut into ſmall pieces by ſome, though the greater number dry it by fire or the ſun, then put it into a bag, in which it is well beaten, and laſtly worked into flour by ſtamping.

Flour of *Kornſyra* † is prepared in the ſame manner, as well as the two other ſorts of wild corn *melur* ‡, by

* Lichen Iſlandicus, Fl. Suec. 1085. Fl. Lapon, 145.

† Polygonum Biſtorta.

‡ 1) Arunda arenaria; 2) arundo foliorum lateribus convolutis.

ſeparating

ſeparating it from the chaff, by pounding, and laſtly by grinding it.

Surt ſmoer (ſour butter). The Icelanders ſeldom make uſe of freſh or ſalt butter, but let it grow ſour before they eat it: in this manner it may be kept twenty years, and even longer; and the Icelanders look upon it as more wholeſome and palatable than the butter uſed amongſt us. It is reckoned better the older it is; and one pound of it then is as much valued as two pounds of freſh butter.

Striug, or whey boiled to the conſiſtence of ſour milk, and preſerved for the winter.

Fiſh of all kinds, both dried in the ſun and in the air, and either ſalted or frozen: thoſe prepared in the laſt manner are preferred by many.

The fleſh of bears, ſheep, and birds, which is partly ſalted, partly hung or ſmoaked, and ſome preſerved in caſks, with ſour fermented whey poured over it.

Miſoſt, or whey boiled to cheeſe, which is very good. But the art of making other kinds of good cheeſe is loſt,

loſt, though ſome tolerably palatable is ſold in the eaſt quarter of Iceland.

Beina-ſtriug, bones and cartilages of beef and mutton, and likewiſe bones of cod, boiled in whey, till they are quite diſſolved; they are then left to ferment, and are eat with milk.

Skyr, the curds from which the whey is ſqueezed, are preſerved in caſks, or other veſſels; they are ſometimes mixed with black crow-berries, (*empetrum baccis nigris*) or juniper berries, and are likewiſe eat with new milk.

Syra is ſour whey, kept in caſks, and left to ferment, which, however, is not thought fit for uſe till it is a year old.

Blanda is a liquor made of water, to which a twelfth part of *ſyra* is added. In winter it is mixed with the juice of thyme, and of the black crow-berries, or the *empetrum nigrum*.

They likewiſe eat many vegetables *, ſome of which grow wild, and others are

* The following catalogue of plants uſed for food in Iceland is taken from the journal of Eggert Olafsen: Rumex

are cultivated ; as alſo ſhell-fiſh * and muſhrooms †.

The Icelanders in general eat three meals a day, at ſeven in the morning, at two in the afternoon, and at nine in the evening.

Rumex acetoſa, in the Icelandic language called *Sura*,
- - - digynus, - - - - - - *Olafs Sura*,
- - - patientia, - - - - *Heimis-niole*.
Taraxacum, - - - - - - *Aetti-fifill*.
Carex, LIN. pinguicula, *Liſia-gras*, uſed againſt the dyſentry.
Trifolium pratenſe flore albo.
Potentilla argentea, *Mura*.
Plantago maritima, LIN. foliis linearibus, *Kattartunga*.
Angelica archangelica, *Huônn* ; *Ætte-huônn*.
Lichen Iſlandicus, *Fialla-graus*.
- - - Lichenoides, *Klouungur*.
- - - Coraloides, *Kræda*.
- - - Niveus, *Mariu-gras*.
- - - Leproſus, *Geitna-ſkof*.
Arundo Arenaria, *Melur*.
- - - foliorum lateribus convolutis.
Cochlearia, *Skarfa-kaal*.
Plantago anguſtifolia, *Selgreſe*.
Epilobium tetragonum, *Purpura-blcomſtur*.
Polygonum biſtort, *Kornſura*.
Siſymbrium, LIN. *Kattar-balſam*.
* Ventroſa craſſa, *Kuſkel, ſkelkuſkel*.
Domiporta, *Kudungur, kufungur, kongur*.
Mytulus, *Kräklingur*.
- - - Major, *Ada*.
† Agaricus cauleſcens, pileo albo, *Ætte-ſvepr*.
- - - ſupra pileo plano, *Ætte-ſvepr*.
- - - ſubconvexo, *Reyde-kula*.
- - - of an unknown ſort, *Bleikula*.

In

In the morning and evening they commonly eat curds mixed with new milk, and ſometimes with juniper berries, and thoſe of crake or crow-berries; in ſome parts they alſo have pottage of *fiálgrás*, which, I aſſure you, is very palatable; *vállidraſli*, or curdled milk, boiled till it becomes of a red colour; *ſeiddmjolk*, or new milk, boiled a long while. At dinner, their food conſiſts of dried fiſh, with plenty of ſour butter. They alſo ſometimes eat freſh fiſh, and, when poſſible, a little bread and cheeſe with them. It is reported by ſome, that they do not eat any fiſh till it is quite rotten; this report, perhaps, proceeds from their being fond of it when a little tainted: they however frequently eat fiſh that is quite freſh, though in the ſame manner as the reſt of their food, or often without ſalt.

On Sunday, and in harveſt-time, they have broth made of meat, which is often boiled in *ſyra*, inſtead of water; and in winter they eat hung or dried meat.

Their

Their common beverage is milk, either warm from the cow, or cold, and ſometimes boiled; they likewiſe make butter-milk, with or without water. On the coaſts they generally drink *blanda* *, and ſour milk; which is ſold, after it is ſkimmed, at two-fifths of a rix-dollar a caſk: ſome likewiſe ſend for beer from Copenhagen, and ſome others brew their own. A few of the principal inhabitants alſo have claret and coffee. The common people ſometimes drink a kind of tea, which they make from the leaves of Holta-ſoleyg † and Speedwell ‡.

This is the uſual manner of life in Iceland. In all countries the living of the poor differs eſſentially from that of the rich; and if an Iceland gentleman can afford to eat meat, butter, ſhark, and whale, the peaſants are obliged to content themſelves with fiſh, blanda,

* In Elfdalln Wermeland in Sweden, the common beverage of the country people is milk, mixed with water, and called by them *Blanda*.

† Dryas octopetala.

‡ Veronico officinalis.

milk pottage of rock-graſs, and *beina-ſtriug*. Though the Icelanders cannot in general be ſaid to be in want of neceſſary aliment, yet the country has ſeveral times been viſited by great famines: theſe, however, have been chiefly owing to the Greenland floating-ice, which, when it comes in great quantities, prevents the graſs from growing, and puts an entire ſtop to their fiſhing.

I need not acquaint you, that we were not neceſſitated to ſubmit to their manner of life during our ſtay in Iceland. Inſtead of *blanda* we drank port, and ſeveral other ſorts of good wine; and a French cook prepared for us ſome ſavoury diſhes, and excellent puddings.

However, as we wiſhed to try every thing, we prevailed upon the phyſician, Biarne Paulſen, who had invited us to dinner, to entertain us after the Icelandic manner. We did not forget the good Swediſh cuſtom of taking a glaſs of brandy before dinner, which was here genuine; we had only once Daniſh diſtilled corn-brandy, which

was ſerved up with biſcuit, cheeſe, and ſour butter. In the middle of the table was placed a diſh with dried fiſh cut ſmall; the other diſhes were a piece of good roaſt mutton, broth with *ſyra*, and a diſh of ſalmon-trouts, &c. &c. We eat with a very good appetite; but the ſour butter and dried fiſh were not often applied to; on the whole, we eat a greater quantity of bread than the Icelanders generally do.

So elegant an entertainment could not be without a deſſert; and for this purpoſe ſome whale and ſhark (*hafkal*) were ſerved up; which are either ſalted, &c. boiled or dried in the air, looks very much like ruſty bacon, and had ſo diſagreeable a taſte, that the ſmall quantity we took of it, drove us from the table long before our intention. Moſt probably you already thank me for my entertainment, and are happy to ſee the end of my letter.

LETTER

LETTER X.

To Chevalier IHRE.

Of the Employment of the Icelanders, and their Chronology.

Stockholm, Sept. 6, 1774.

THE Icelanders principally attend to fiſhing, and the care of their cattle.

On the coaſts the men employ their time in fiſhing, both ſummer and winter; on their return home, after they have drawn and cleaned their fiſh, they give them to their wives, whoſe care it is to dry them. In the winter, when the inclemency of the weather prevents them from fiſhing, they are obliged to take care of their cattle, and ſpin wool. In ſummer they mow the graſs, dig turf, provide fuel, go in ſearch of ſheep and goats that are gone aſtray, and kill cattle. They likewiſe attend to their *wadmal*, or coarſe cloath; for that purpoſe they

make uſe of urine, which they alſo uſe for waſhing and bucking, inſtead of ſoap and pot-aſhes. The men likewiſe prepare leather, and uſe *miadurt* (ſpiræa ulmaria) inſtead of the bark of birch. Some few work in gold and ſilver, while others are inſtructed in mechanics, and are tolerable proficients therein.

As a proof of this, I need only mention a ſledge that a peaſant contrived ſome years ago in the form of a ſhip with ſail: and large enough to contain four or five perſons, that would ſail, in the winter ſeaſon, in an even country. Unluckily, two of his ſons, in ſailing home from church, overturned, and broke the whole carriage to pieces.

On the weſt ſide of the country they make veſſels of floating wood, large enough to contain from three to twelve tons, and according to the ſize of the veſſel charge from four to ſix dollars.

The women prepare the fiſh, take care of the cattle, manage the milk and the wool, ſew, ſpin, and gather eggs and down. When they work in

the evening, they uſe, inſtead of an hour-glaſs, a lamp, with a wick made of *fiva* (epilobium) dipt in train-oil, which is ſo contrived as to burn four, ſix, or eight hours.

Their work is in ſome meaſure determined by their *bya-lag*, or by-laws* of their villages, in which the quan-

* "By-laws are ſaid to be orders made in court-leets or court-barons, by common aſſent, for the good of thoſe that make them, farther than the public law binds." *Atterbury. See Johnſon's Dict.* Though this may probably be the preſent meaning of the word *By-law*, it is not, however, the original meaning of the word; for it is derived from the old Saxon word *by* or *bye*, ſignifying a town, from the Gothic word *bo*, to inhabit; and agreeable to this are many Engliſh names of towns, viz. *Aſh-by*, *Whit-by*, &c. &c. *By law*, therefore, ſignified formerly laws made by townſhips, and by diſtricts belonging to a town, or to a leet, which amounted ſometimes to a third part of a ſhire. Theſe laws were made by common aſſent, and for the good of thoſe that made them, which is, or ought to be, the chief aim of all laws, and they extend farther than the public law binds; becauſe the law of the land muſt be general, and cannot provide for all particular caſes of ſingle towns and diſtricts. The ſpecial regulations and reſtrictions, therefore, made by the common aſſent of the towns-people, for the common good of that particular town, beyond the law of the land, are *by-laws*, laws of the *bye* or *town*. The Icelandic word *bya-lag* ſignifies laws of villages or townſhips; and it confirms the ſignification we have given to the Engliſh word *by-law*.

tity of work they are bound to perform in a day is ordered: they ſeldom do ſo much work now, therefore it is only called *medelmans värk*, or the work of a man of middling ſtrength. According to theſe by-laws, a man is to mow as much hay in one day, as grows on thirty fathoms ſquare of manured ſoil, or forty fathoms ſquare of land not manured, or he is obliged to dig 700 pieces of turf eight feet long and three broad. If ſo much ſnow falls as to reach to the horſes bellies, which they call *quedſnio*, he is to clear away daily the ſnow for a hundred ſheep. A woman is to rake together as much hay as three men can mow, or to weave three yards of *wadmal* in a day.

The wages of a man are fixed at four dollars, and twelve yards of *wadmal*; and thoſe of a woman at two dollars and five yards of *wadmal*. When the men are ſent a fiſhing out of the country, there is allowed to each man, by the *bya-lag*, from the 25th of September to the 14th of May, ſix pounds of butter and eighteen pounds of dried

fiſh

fiſh every week. This may appear to be too great an allowance ; but it muſt be remembered, that they have nothing beſides to live upon. When they are at home, and can get milk, &c. every man receives only five pounds of dried fiſh and three quarters of a pound of butter each week.

As the compuation of time among the Icelanders is not determined according to the courſe of the ſun, but by their work, this is perhaps the moſt proper place to ſay ſomething of it. Though they have, like us, four different ſeaſons, they only count two; the ſummer, that begins the Thurſday before the 16th of April ; and the winter, that commences on the Friday before the 18th of October. During the firſt ſeaſon they perform their ſummer-work, and in the latter attend to their winter amuſements. Theſe two ſeaſons are afterwards divided into twelve months, as with us, which have their common names ; but in antient records, and among the lower claſs of people, they are called, 1. *Midſvetrar.* 2. *Föſtugangs m.* 3. *Iafndaegra m.* 4.

Sumar m. 5. *Fardaga m.* 6. *Nöttleyſu m.* 7. *Midſumar m.* 8. *Heyanna m.* 9. *Adratta m.* 10. *Slaatrunar m.* 11. *Ridtidar m.* 12. *Skammdeigis m.* Day and night are not divided into a certain number of hours, but into the following diviſions: *Otta* is with them three o'clock in the morning; *Midur morgon*, or *Herdis riſmal*, five o'clock; *Dagmal*, half paſt eight; *Haadeye*, eleven; *Nonn*, three in the afternoon; *Midur afton*, ſix in the evening; *Nattmall*, eight; and *Midnatt*, midnight.

When they want to know what o'clock it is, they attend to the courſe of the ſun, and the flux and reflux of the ſea; but generally they make uſe of an art to diſcover the ſun by their fingers. Watches are very rare among them; every peaſant, however, has an hour-glaſs.

LETTER

LETTER XI.

To Chevalier BACH.

Of the Diſeaſes in Iceland.

Stockholm, Oct. 1, 1776.

YOU require, Sir, that I ſhould give you ſome account of the diſeaſes common in Iceland. I will obey your commands, though it is more the province of a phyſician to undertake the ſubject, as it requires ſo much exactneſs and penetration.

As I have been ſo happy as to be unacquainted with any diſeaſe from my own experience, I have as little endeavoured to gain any knowledge by reading ſuch books as treat of them; you will therefore pardon me if my account is not perfect.

The climate of the country, and the purity of the air, contribute very much to make the Icelanders ſtrong and healthy, though their food and way of life frequently produce the

contrary effect. Young children, for example, are not ſuckled more than two or three days, and afterwards brought up with cows milk, which, in times of dearth, is mixed with flour and water.

I remember to have heard, that this is alſo cuſtomary in ſome parts of Finland; but a different manner of living may render that unwholeſome in Iceland, which is leſs ſo in another place: and I think I may ſafely venture to affirm, that the food and mode of living in Iceland do not at all contribute to the ſtrength of the inhabitants. One ſeldom meets with any of them above fifty or ſixty years of age, and the greater part are attacked in their middle age by many grievous complaints.

It is remarkable that among the female ſex, who there, as almoſt every where elſe, live to a greater age than the men, thoſe particularly who have had many children attain to an advanced age. There are a great many of this claſs, as the women are commonly very fruitful; and it is no rare thing to meet with a mo-

a mother who has had twelve or fifteen children.

Among the diſeaſes that are moſt prevalent, the ſcurvy (*Skyrbiugur*) is the moſt common. In ſome it makes its appearance in the ſame manner as with us, but in others it produces the moſt dreadful ſymptoms, and is then called *liktraad*, or leproſy, which, however, differs from that horrid diſeaſe ſo common in the Eaſt. Its firſt appearances are, ſwellings in the hands and feet, and ſometimes alſo in other parts of the body: the ſkin becomes ſhining, and of a bluiſh caſt, the hair falls off, the ſight, taſte, ſmell, and touch are weakened, and often quite loſt; biles appear on the arms, legs, and face; reſpiration becomes difficult, and the breath fœtid; aching pains are felt in all the joints, a breaking-out ſpreads over the whole body, and is at laſt converted into ſores that generally terminate in death.

The Icelanders make uſe of antiſcorbutic decoctions, likewiſe baths, with turnips boiled in them; but chiefly

chiefly mercurial remedies, by means of which the diſeaſe may be removed in its beginning. This diſeaſe is not contagious, but very obſtinate; and it is remarkable, that two generations may be entirely free from it, when it ſhall appear in the third. It does not always prove mortal, though many are tormented with it twenty or thirty years.

The gout (*torrvàrk*): moſt men have it, who go out a-fiſhing, in their hands, probably becauſe they are obliged to handle and manage the wet fiſhing-tackle in cold weather.

The St. Anthony's fire, in Icelandic *aama*, is pretty common. They make uſe of earth-worms (*anamadkur*) to cure it, which they bind alive on the afflicted part; and when they become dry, freſh ones are applied till the diſeaſe is removed.

The jaundice, in Icelandic *guulſot*; the fever, *kvefsot*; the pleuriſy, *tak*, which is ſometimes infectious, and then is called *landfarſot*, or an infectious diſeaſe, that is frequently got by cold; lowneſs of ſpirits, *careinoma infantum*, in Icelandic *krabbe a atumein*; the

the ſpleen, and obſtructions of the menſes, are very common. In later years the rickets have made their appearance; and the venereal diſeaſe was not known among them till the year 1753.

Beſides the antiſcorbutic plants to be found in plenty in Iceland, they have a number of hot baths, which are of great benefit in the cure of theſe diſeaſes.

There is an apothecary's ſhop eſtabliſhed on the iſland, and four hoſpitals for the poor and leprous, the care of which is committed to their moſt ſkilful phyſicians, with proper aſſiſtants.

LETTER

LETTER XII.

To Chevalier IHRE.

Of Fiſhing, Fowling, and the Breed of Cattle in Iceland.

Stockholm, Oct. 3, 1774.

THE inhabitants who live near the coaſts employ themſelves almoſt the whole year in fiſhing; and even thoſe who live in the inland parts of the country come to the ſea-ſhore at certain ſeaſons. Every maſter of a family has a particular fiſhing-dreſs, and is obliged to furniſh one to his ſervant as ſoon as he puts to ſea. They are made of ſheep or calves ſkins, which, in manufacturing, are frequently rubbed over with train-oil. They conſiſt of the following articles: *Leiſtrabrakur* are breeches and ſtockings all in a piece, that come up pretty high above the hips, and are laced on very tight; *ſtackur*,

ſtackur, a wide jacket faſtened round the neck and the middle of the waiſt; *taatillar*, or coarſe ſtockings, of ſtiff worſted; and *ſioſkor*, or water-ſhoes, of thick leather.

Their boats are commonly ſmall, and only contain from one to four men, with theſe they fiſh near the ſhore; but with their larger boats, which are made to contain from twelve to ſixteen men, and are provided with ſails, they frequently venture from four to eight miles on ſea.

In theſe veſſels they always carry a man extraordinary, whom they call *formann*. He ſits at the helm; and the others, who are called *haaſeters*, obey his commands. At his call they all aſſemble at an appointed time near the veſſel, provided with knives, fiſhing-lines, and other proper tackle: they make uſe of ſhells, and ſometimes the fleſh of quadrupeds and birds for baits.

As ſoon as the boat is from ſhore, they all take off their hats and caps, pray for good ſucceſs, and recommend themſelves

themſelves to the divine protection by a prayer and hymn, which they call *vararſaungur*, and then ſtand out to ſea. As ſoon as they are come to a place where they expect a good draught, two of them ſit down at the helm, to prevent the boat's being moved out of its place by the current, and to take care that the fiſhing-lines are not entangled. In this manner they continue fiſhing the whole day; and when the boat will not contain any more fiſh, they cut off the heads of all they have caught, which they throw into the ſea, together with their entrails. This not only enables them to carry a far greater number of fiſh aſhore, but alſo invites many inſects to take place, that are good baits.

At their return, all the fiſh are brought aſhore, and divided into equal ſhares: one ſhare belongs to the owner of the boat, though he ſhould not be out at ſea with them, and this is called *ſkipleiga* (ſhip-ſhare); another is given to him who ſat at the helm; a third to him who governed the ſails; in a word, every fiſherman gets one ſhare. But this equal diviſion

viſion is only made with the ſmaller fiſh; for if any one in the boat is ſo fortunate as to catch a turbot or other valuable fiſh, it is immediately cut into pieces, and the three beſt given to him who caught it.

As ſoon as they have thus ſhared them, every one cuts off the heads of his fiſh, draws them, and after cutting them up from top to bottom on the ſide of the belly, takes out the back-bone from that part where it is fixed to the head, down to the third joint below the heart. If the weather be ſuch as to give them hopes of drying their fiſh next day, they lay them with the fleſhy ſide facing one another; but if the weather is unfavourable, they lay the pieces on a heap with the ſkinny ſide uppermoſt, and this they call *lagga i kaſe*; if they lie too long in this poſition, or one above another, they ſpoil, and are then ſold to the merchants at a lower price, under the denomination of *kaſad fisk*. When the weather is fair, theſe pieces are ſpread ſeparately on ſtones, or on the ſhore, and are frequently turned by the

the women, till they are entirely dry; this often requires a fortnight's time, and ſometimes more. The fiſh prepared in this manner are called *flat-fiſkur*, or flat fiſh.

In ſome parts they do not dry the fiſh on ſtones or on the ſhore; but after they have ripped them up, place them in rows on ſtones that are laid croſs-wiſe in a houſe built for that purpoſe; theſe huts are called *hiallur* in Iceland, and ſomewhat reſemble the ſheds in which ſmiths ſhoe horſes. Theſe fiſh are called *hengi-fiſkur*, or hung fiſh.

The fiſh they principally catch is cod, of which they have ſeveral different ſorts, under the names of *thyrſk-lingur*, *upſe*, *iſa*, *langa*, *keila*, &c. Beſides theſe they have ſoles, flounders, herrings, ſalmon, ſalmon-trout, trouts, and ſeveral others. Of the trouts it has been obſerved, that when they come up the rivers and brooks, and approach the hot ſprings, they are fond of ſtaying in the lukewarm water, where they grow ſo fat as to be ſcarcely eatable.

It is unneceſſary to ſay, that the ſeas, as well as the rivers and lakes, abound with fiſh: I will therefore only mention the whale, of which there are ſeveral ſorts, divided by the natives into two claſſes, thoſe with and thoſe without teeth.

The firſt are again divided into *Skidis-fiſkur*, ſmooth-bellied, and *Reydar-fiſkur*, or wrinkle-bellied. Among the *Skidis-fiſkur*, who have whale-bone inſtead of teeth, the *ſlettbakr*, whoſe back is flat, is the largeſt; and ſome have been caught one hundred Swediſh ells (of twenty-three and a quarter Engliſh Inches) in length. The *hnufubakr* has a hump on his back, and is next in ſize, being from ſeventy to eighty ells long. Of all the known whales that belong to the claſs of the *Reydar-fiſkur*, the *ſteipereidur* is thought to be the largeſt, as there are ſome one hundred and twenty ells in length. Then follow the *hrafn reydur* and the *andarnefia*; they are all conſidered as very dainty food; and the Icelanders ſay, the fleſh has the taſte of beef.

The whales that have teeth inſtead of whalebone are alſo divided into two claſſes, thoſe that are eatable, and thoſe that are not. To the firſt claſs belong the *hnyſen*, *hnydingur*, *hundfiſkur*, and *haahyrningur*: to the laſt, to which the name of *Illhwele* is given, are reckoned the *rodkammingur* and *naahvalur*. Theſe are forbidden as food by ſome antient regulations, and particularly by the church laws. The Icelanders believe, that the firſt ſort are very fond of human fleſh, and therefore avoid fiſhing in ſuch places where they appear.

The above kinds of whales are ſometimes ſtruck with harpoons, and ſometimes caught with nets. The Icelanders, however, ſeldom venture to attack the larger ones, as their boats are ſmall, and they unprovided with inſtruments proper for that purpoſe. They ſtand in ſo great dread of ſome of them, that when out at ſea, they are afraid to mention even their names, and carry dung, brimſtone, juniper-wood, and ſome other articles of the ſame nature in their boats, in order to terrify

terrify and prevent their too near approach. Notwithſtanding, it now and then happens that they catch ſome of the largeſt ſort, which is done when the fiſh approach too near the ſhore at high water, and are unable to return as faſt as the water ebbs, where they are killed with ſtones and lances. In this manner they had caught a large whale the year before our arrival at Hafnefiord.

To their fiſhery likewiſe may be reckoned the catching of ſeals, which is very conſiderable in ſome parts. They have four ſorts of them, *roſtungur*, *vade-ſelur*, *blaudu-ſelur*, and *gran-ſelur*. They are fatteſt in winter, and yield three or four * *liſpfund* of fat, each of which produces three one half † *kanne* of oil: in ſummer, on the contrary, they are very lean. Their fleſh is eaten, the fat ſold at five yards of *wadmal*, and the ſkin by weight, at the rate of ſixty yards for each *liſpfund*.

Though the ſituation of Iceland renders it extremely proper for fiſhing, yet the fiſhery has decreaſed very

* A *Liſpfund* is twenty pounds Engliſh.
† A *Kanne* about three quarts Engliſh.

much lately ; which is partly owing to the many foreign ſhips that yearly come to fiſh in thoſe parts, and partly to the want of fiſhermen, as the number of people has decreaſed greatly. But I believe the chief cauſe is the monopoly of the trading company, that very much oppreſſes the country.

If the people had more encouragement, there would be more emulation and diligence among them than at preſent ; for they are obliged to ſell a *vaett*, or five *liſpfund*, of dried fiſh to the company, at the rate of five-ſixths of a dollar, which they ſell again in Hamburgh, where the greateſt part of what is caught in Iceland is uſually ſent, for five bank-dollars.

Next to fiſhing, the principal ſupport of the Icelanders is the breeding of cattle.

Their beeves are not large, but very fat and good. It has been reported by ſome, though without foundation, that there are none among them with horns : it is however true that they ſeldom have any.

The large cattle are kept at home in their yards the greater part of the year,

year, though ſome have places appropriated to them in the mountains, which they call *ſatr*, where they ſend their cattle during the ſummer, till the hay harveſt is over. They have a herdſman to attend them, and two women to milk them and make butter and cheeſe. It is common to meet with oxen running wild about the mountains, which are however drove home in autumn, as every one knows his own by a particular mark put upon them.

The principal food of the cattle is hay, and they reckon a ſtack of hay for a cow's winter proviſion; a ſtack conſiſts of thirty cocks * *kapal* of hay, grown on manured land, and forty cocks *kapal* grown on unmanured land. When there is a ſcarcity of fodder, they feed them in ſome parts with *ſteenbitr*, a kind of fiſh, which, togegether with the heads and bones of cod, is beaten ſmall, and mixed with one quarter of chopped hay. The cattle are fond of it, and yield a good deal of milk after it; but yet it is ſaid

* A *kapal* is from 12 to 15 *liſpfunds*.

to have a bad taſte, and they only make uſe of this food in time of need.

Their cows yield four *kanne* of milk a day, though they have ſome that give from eight to fourteen in four-and-twenty hours. A cow that yields ſix quarts is reckoned a good one, and muſt not ſtand dry above three weeks before ſhe calves.

A young calf is fed with milk for ten days or a fortnight, afterwards the milk is mixed with water and chopped hay, and at laſt they give it whey inſtead of milk.

The uſual price of a cow, as well as of a horſe, is one hundred and twenty ells, thirty of which make a dollar. However, ſometimes the better ſort of horſes are ſold for eight or ten rix-dollars. They have leſs trouble with their horſes than their cows; for though ſome ſaddle-horſes are kept in ſtables during winter, the greater number of them are obliged to provide for their own ſubſiſtence, and when they cannot find this on land, they go in ſearch of ſea-weeds on the

the coaſts: but when a great quantity of ſnow has fallen, the natives are obliged to clear it away for them.

There is no breed of cattle ſo much attended to in Iceland as that of ſheep. As theſe can eaſily find ſubſiſtence there, the Icelanders look upon it as leſs troubleſome and leſs expenſive to breed them; and there are many peaſants who have from two to four hundred ſheep. Before the epidemical diſeaſe, which raged among the ſheep from 1740 to 1750, it was not uncommon to ſee flocks of one thouſand or twelve hundred, the ſole property of one perſon.

I will not venture to examine, whether it would be more advantageous to huſbandry to keep more cows than ſheep; but as the inhabitants ſeem to be more inclined to breeding of ſheep, it would be well if ſuch regulations were made as might enable them to cultivate it with more advantage.

This has really been thought of by government; for about twenty years ago they ſent baron Haſtfer, a

Swede by birth, to Iceland for that very purpoſe. He made ſeveral regulations, and invented and prepared a kind of powder, as a cure for the diſeaſes among ſheep, which is very much made uſe of there, as well as in Denmark and Norway. They ſpeak of him every where in Iceland, as of a man who had great knowledge in this branch of huſbandry, and a ſincere deſire to redreſs all defects.

I know not if the report was well founded, which was ſpread all over the country, that the trading company endeavoured to obſtruct him in the execution of this deſign: ſo much however is certain, that the country has reaped little or no benefit from baron Haſtfer's diſpoſitions.

The Icelandic ſheep differ from ours in ſeveral particulars; they have ſtrait ears ſtanding upright, a ſmall tail, and it is common to meet with thoſe that have four or five horns: in ſome places they are kept in ſtables during winter; but they are generally left to ſeek their food themſelves in the fields.

It is remarkable that they are fond of hiding themſelves in caves (of which there are a great many in Iceland) in ſtormy, tempeſtuous weather. But when they cannot find any retreat during a heavy fall of ſnow, they place themſelves all in a heap, with their heads to the middle, and bent towards the ground, which not only prevents them from being ſo eaſily buried under the ſnow, but facilitates the owner finding them again. In this ſituation they can remain ſeveral days; and there are examples of their having been forced by hunger to gnaw off each others wool; which, forming balls in their ſtomachs, preſently deſtroys them. They are however generally ſoon ſought for and diſengaged. There are no wild ſheep, as has been pretended by ſome; for they all have their owners, who keep an exact account of them; and when they are driven to the mountains, they are ſcarcely ever without a ſhepherd to attend upon them.

Their food is graſs and herbs, and the ſcurvy-graſs (*cochlearia*) in particular

ticular makes them ſo fat, that they yield more than twenty *liſpfund* of fat. They reckon one *kapal* of dunged hay, and two not dunged, for a ſheep's winter proviſion. When there is a bad crop, they are obliged to put up with fiſh bones chopped, as well as the other cattle.

Good ſheep give from two to ſix quarts of milk a day, of which both butter and cheeſe is made; it has likewiſe a good taſte when boiled.

But the principal profit they have from their ſheep ariſes from the wool; this is not ſhorn off as among us, but remains on till the end of May, when it looſens of itſelf, and is ſtripped off at once like a ſkin, and is then called *Ullafat*. The whole body is by this time covered again with new wool, which is quite ſhort and fine, and of better quality than the Swediſh. It continues to grow the whole ſummer, and becomes coarſer and ſtiffer towards autumn; it is likewiſe ſmooth and gloſſy, ſomewhat reſembling camel's hair, but more ſhaggy. This covering enables the ſheep to ſupport the

the rigours of winter; but after they have loſt their wool, if the ſpring proves a wet one, they take care to ſow a piece of coarſe cloth, or *wadmal*, round the ſtomach of the weakeſt, and thoſe that have leaſt wool.

A good ſheep, againſt which no exceptions can be made, muſt, according to their by-laws, at leaſt afford four pounds of wool; and it is not uncommon for them to produce more.

It is not unuſual for an ewe to have two lambs at a time, and ſometimes even three; they then take away one lamb from the mother, and give it to another who has loſt hers. When the lambs are too weak to follow the mother, they are kept at home and fed upon milk, which is done by means of a quill and a wet piece of ſkin.

The price of ſix ews, from two to four years old, together with their lambs and wool, is four dollars in autumn, according to the land-tax: a weather of four years old is ſold for one dollar; but it is the cuſtom for a merchant to pay only five marks. If any body ſells a lamb ready killed, it is

is valued according to the quantity of fat it has, at the rate of two marks for every pound. The fleſh alone, without the head, feet, entrails, fat, ſkin, and wool, is valued at twenty yards, and the bye-laws fix the price of a pound of dried mutton at half a yard. The ſkin is ſold by weight, after the rate of thirty fiſh for half a *liſpfund*.

They have goats in ſome places, but they are few in number; and, upon enquiry, I found the reaſon to be that they do not thrive in a country where there is no wood.

Beſides theſe animals they have three kinds of dogs in Iceland, *fiar hundar*, or *lumbar*, ſhag dogs; and *dyrhundar* and *dverghundar*. As alſo tame and wild cats, which laſt are called *urdarkettir*; rats, white and brown foxes, ſome of which eat graſs, and are on that account called *gras tofur*. To root out theſe animals, the king has ſet a premium of a rix-dollar upon every ten fox ſkins that are ſold to a merchant. The natives have likewiſe made an agreement, that whoſoever deſtroys a fox's hole, toge-

ther

ther with the fox, the ſhe-fox, and their young, is to receive one rix-dollar, which the neighbours collect among themſelves.

Rein-deers were not known here formerly; but by governor Thodal's order, thirteen head were ſent from Norway in 1770, by Mr. Sorenſon, merchant: ten of which died before they reached Iceland, for want of proper care; the three remaining ones thrive extremely well, and had fauned three times before we came there: they do not want for food, as the country abounds with moſs.

After having treated of their fiſhery and the breed of their cattle, I think this a very proper place to ſay ſomething of their birds, which, in regard particularly to thoſe of the aquatic kind, are very important to them.

They are found in great abundance every where on the coaſt; but the greateſt number by far are caught in the few places where they breed. The eggs the Icelanders themſelves make uſe of, as likewiſe of the fleſh, which is eaten by a great many; but

but with the feathers and down they carry on a very conſiderable trade.

It would be unneceſſary to mention all the different ſorts of birds, eſpecially as there is ſcarcely any country where ſo many kinds, and ſuch great numbers of them, are to be met with as in Iceland. Among the great abundance of geeſe, water-fowls, ducks, &c. I will however ſay ſomething of the ſwan and the eider bird or duck.

It is known that the ſwan belongs to the claſs of birds of paſſage; their numbers increaſe very much towards winter, though there is no ſcarcity of them at any time, as the greater part of the young breed conſtantly remain there. In ſpring we may often ſee a hundred of them in a flock, and frequently many more; and it is then thought that part of them advance yet further to the north, and makes but a very ſhort ſtay in Iceland. During ſummer they reſort to the lakes; but when winter approaches, and they begin to freeze, they remove to the ſea ſhores. Their eggs are gathered in the beginning of ſpring;

they

they are large, and ſaid to be very palatable. In Auguſt, when they loſe their feathers, they are hunted on the lakes, where they are to be found at that time, with dogs trained to catch them alive. They are ſaid to ſing very harmoniouſly in the cold dark winter nights; but though it was in the month of September when I was upon the iſland, I never once enjoyed the pleaſure of a ſingle ſong. An old ſwan has a fiſhy taſte, but the young ones are reckoned among the beſt eatable fowls.

The eider bird or duck is yet more uſeful to the natives, who conſider it as a kind of treaſure; and it is ſeldom heard that a prudent houſekeeper ſhoots or kills any of them.

The eider birds generally build their neſts on little iſlands not far from the ſhore, and ſometimes even near the dwellings of the natives, who treat them with ſo much kindneſs and circumſpection, as to make them quite tame. In the beginning of June they lay five or ſix eggs, and it is not unuſual to find from ten to ſixteen eggs in

in one neſt together, with two females, who agree remarkably well together. The whole time of laying continues ſix or ſeven weeks, and they are fond of laying three times in different places: in the two firſt, both the eggs and down are taken away, but in the laſt place this is ſeldom done. Thoſe to whom one of theſe places belong, viſit it at leaſt once a week.

When they come to the neſt, they firſt carefully remove the female, and then take away the ſuperfluous down and eggs, after which they replace the female on the remaining ones, when ſhe begins to lay afreſh, and covers her eggs with new down which ſhe has plucked from herſelf: when ſhe has no more down left, the male comes to her aſſiſtance, and covers the eggs with his down, which is white, and eaſily diſtinguiſhed from the female's; where it is left till the young ones are hatched, who in an hour afterwards quit the neſt together with the mother, when it is once more plundered.

The beſt down and the moſt eggs are got during the firſt three weeks of their

laying; and it has in general been obſerved, that they lay the greateſt number of eggs in rainy weather. As long as the female ſits, the male is on the watch near the ſhore; but as ſoon as the young are hatched, he leaves them: but the mother remains with them a conſiderable time after; and it is curious to ſee how ſhe leads them out of the neſt as ſoon as they creep out of the eggs, and goes before them to the ſhore, whilſt they trip after her: when ſhe comes to the water-ſide, ſhe takes them on her back, and ſwims with them for the ſpace of a few yards, when ſhe dives, and the young ones, who are left floating on the water, are obliged to take care of themſelves. One ſeldom ſees theſe birds on land afterwards, for they generally live in the damp rocks in the ſea, and feed on inſects and ſea-weeds.

One female, during the whole time of laying, generally gives half a pound of down, which is however reduced to one half after it is cleanſed. The down is divided into *thang-duun* (ſea-weed down) and *gras-duun* (graſs down).

down). The laſt ſort is thought to be the beſt, and is cleanſed in the following manner: ſome yarn is ſtreaked in a ſquare compartment round a hoop, on which the down is laid. A pointed piece of wood is then moved backwards and forwards on the lower ſide of the yarn thus ſtreaked, which cauſes the coarſer feathers to fall through, while the fine down remains on the yarn.

Down plucked from dead eider-birds is of little worth, becauſe it has then loſt the greateſt part of its elaſticity; for this reaſon it is of little value in Iceland. The other ſort is ſold at forty-five fiſh a pound when cleanſed, and at ſixteen fiſh when not cleanſed. There are generally exported every year on the company's account 1500 or 2000 pounds of down cleanſed and not cleanſed, excluſive of what is privately exported by foreigners. In the year 1750, the Iceland company ſold as much in quantity of this article, as amounted to 3747 rix-dollars, beſides what was ſent directly to Gluckſtadt.

Among

Among the land birds that are eatable, ptarmigans are not to be forgotten, and are caught in great numbers. Falcons alſo abound in the iſland, of which there are three ſorts; they are purchaſed by the royal falconers, who give fifteen rix-dollars each bird for the white, ten for thoſe that are dark-coloured, and ſeven for the grey,

LETTER XIII.

To Chevalier IHRE.

Of the Iceland Trade.

Stockholm, Nov. 12, 1774.

THE Iceland trade has been ſubject to many revolutions. Till the year 1400 the Norwegians were almoſt the only nation who ſailed to Iceland, and bought all the fiſh the Icelanders did not conſume or export in their own ſhips. The Engliſh afterwards had this trade till the Reformation, when it fell into the hands of the Germans, and was particularly advantageous to the Hamburghers. But Chriſtian the Fourth, who had the improvement of the whole Daniſh trade very much at heart, directed his attention likewiſe towards Iceland. He prohibited the trade of the Hans-towns thither in the year 1602, and beſtowed it on Copenhagen, Malmo, and ſome other

other towns at that time ſubject to the crown of Denmark.

The Iceland company at Copenhagen was, however, not eſtabliſhed till the year 1620, after the king had once more prohibited the trade of the Hans-towns to Iceland in 1619. This company continued till the year 1662, when it was ſuppreſſed by a ſpecial order. What contributed to this was the great damage done in Iceland by ſome pirate in 1627, who carried away a great number of its inhabitants; the greater part of whom were, however, redeemed by the king nine years after. The king reſented this ſo much the more, as the Iceland company had not only undertaken to provide the country with all neceſſary articles, but likewiſe to protect it. This circumſtance produced a diſagreeable effect to the company, which was, that thoſe who had ſhares in the ſtocks of 1000 rix-dollar, only received 500; and thoſe who had ſhares of 200 rix-dollars, received not the leaſt conſideration. The company paid a certain ſum to the king for every haven, and two rix-dollars to the

governor for every ſhip. It was likewiſe obliged to contribute ſomething to the king's magazines on the Weſtmanns Iſlands.

The trade of every haven was afterwards diſpoſed of to the higheſt bidder once in every ſix years; but ſince 1734 it has been in the poſſeſſion of a trading company, who have a grant of it, for which they pay a duty of 6000 rix-dollars a year to the king. They ſend from 24 to 30 ſhips thither every year, loaded with corn, bread, wine, iron, and wood, &c. and they export in return from 22 havens, fiſh, fleſh, butter, blubber, ſkins, wool, and woollen manufactures, which they exchange for the merchandize brought thither according to a tax ſet in the year 1702. It is difficult to determine whether the company gains much by this trade or not; ſo much at leaſt is certain, that the Icelanders loſe by it; for the Dutch, diſregarding or evading the tax, import much better goods than the company. For this reaſon the Icelanders ſell a conſiderable quantity of fiſh to them privately, though

ſeveral

ſeveral Dutch ſhips have been confiſcated on account of carrying on a ſmuggling trade. The agents of the Iceland company are aware of this, by the ſmall ſtock that remains for their purchaſe, with which they are much diſſatisfied.

There it a market kept every year at Hraundals-retter, to which thoſe reſort who live up the country; they exchange butter, cloth, and ſheep, for fiſh, blubber, and other articles of that kind. At Reikavik there is a woollen manufactory, where twenty or thirty workmen are employed: one likewiſe meets with a few looms here and there; and many more might be eſtabliſhed among the peaſants, if encouragement was given them.

Daniſh money is current in the country, but the whole ſtock of ready money cannot amount to many thouſand rix-dollars. Their accounts are not all kept in money, but according to yards and fiſhes: 48 fiſhes, each fiſh reckoned at two pounds, make one rix-dollar, and twenty-four ells make one likewiſe. You may buy a

horſe for 150 fiſh, and a farm for 6000 ells. A *vatt* is five *liſpfund*, and a *faering* ten pounds. They reckon 163 quarts to a tun, and five to a *kuttur*. The Icelandic ell is as long as the Hamburgh ell, three of which make a fathom.

LETTER

LETTER XIV.

To Chevalier IHRE.

Of the Icelandic Literature.

Stockholm, Dec. 4, 1774.

THE hiſtory of antient times ſhews us that our anceſtors did not deſpiſe arts and ſciences, though they peculiarly diſtinguiſhed themſelves by valour and heroic deeds. Their religion, mixed with fables, was, however, reduced to ſome rule; and their ſyſtem of morality, though not the pureſt and beſt, however inculcated certain virtues that were in vain ſought for among the more enlightened Greeks and Romans. The long voyages they made without knowing the uſe of the compaſs, is a proof of their having been much better acquainted with aſtronomy and geography, than could have been expected. Phyſic, and particularly ſurgery, muſt have

have been held in high eſteem among ſo warlike a nation, though I queſtion very much whether any perſon would now ſubmit to the manner of curing an external hurt, ſuch as was practiſed among the antients. Their invention exhibits itſelf in riddles, hiſtory, and poetry; and how highly theſe were valued among them, may be proved by many examples, of which I ſhall only mention Egil's poem, in praiſe of Erick Blodoxe, king of Norway, by which he ſaved his life; and Hiarne's epitaph on king Frode, on account of which he is ſaid to have been made king of Denmark.

Though it cannot be entirely aſcertained, that Odin brought the Runic characters to the north; yet it is proved almoſt beyond a doubt, that they were known among us in the fifth and ſixth centuries. The art of writing was alſo known here, if not certain, at leaſt, as early as among the Franks and Germans; the former had no letters before they began to make uſe of the Latin ones in the ſixth century, and the latter were likewiſe un-

acquainted with them before the time of Charles le Gros.

Their taſte for riddles, ſtories, and poetry, the Icelanders alſo brought along with them from their native country, to the iſland where they are now ſettled; and whilſt theſe traces of ſcience diminiſhed in Norway, on account of the troubles which ſhook the whole north during ſeveral centuries, they not only preſerved themſelves in Iceland, which was not expoſed to ſo many diſturbances, but the caſe of their ſafety likewiſe excited the inhabitants to apply themſelves to the ſtudy of hiſtory, that they might by it be informed of the deſigns of their powerful neighbours, and take the beſt and moſt neceſſary meaſures to oppoſe thoſe who only wiſhed for an opportunity of ſubjecting them to their yoke.

It is true they had no ſchools or public ſeminaries for the inſtruction of youth in the ſciences before the introduction of the Chriſtian religion; but it was, however, not altogether neglected, for they took great pains, beſides inuring the bodies of their young men to feats

feats of ſtrength and agility, and teaching them ſuch exerciſes as enabled them to defend themſelves and their countrymen, to inſtruct them alſo in hiſtory, religion, and law. Thence we find in their antient chronicles frequent mention of perſons who had made conſiderable progreſs in theſe ſciences, and even before they received the Chriſtian religion there were many in the country well verſed in the laws.

In their frequent voyages, before the uſe of the compaſs *(Leitarſtein)* was known to them, they diſcovered new countries, when driven out of their courſe, which were however deſerted almoſt as ſoon as found out; yet ſome, if not all of them, have been diſcovered in later times.

Thus Biorn Herjulffson, in a voyage he made to ſee his father in Greenland, was driven by a ſtrong north-wind upon a flat woody country, from whence he afterwards reached his father, after a long and troubleſome voyage, with out thinking any more of his new diſcovery. After the death of his father,

ther, he again returned to Norway; where the account of his voyage raiſed an inclination in one Leifer to go in ſearch of this country. He therefore ſet ſail with 35 men, and at firſt landed on a mountainous country covered with ſnow, without the leaſt appearance of verdure: from whence he continued his voyage, and came to another country that was flat and woody; this he called Markland. He ſet ſail again with a north-eaſt wind, and in two days time arrived at an iſland that lay north of the continent. He now entered weſtward into a ſtrait, where his ſhip ſtruck on the ſand at low water; he then had it drawn aſhore with cables, and having built a houſe, remained there the whole winter: here they did not experience the leaſt cold, and the graſs only grew a little reddiſh in winter. The days were not of ſo unequal a length as in Iceland; and the ſun appeared above the horizon on the ſhorteſt day, both when they breakfaſted and at ſupper-time. The vine and wheat both grew wild, and this occaſioned his giving the name of Vineland

Vineland to the country. This gives us room to conjecture that he advanced pretty far towards the ſouth of America. They afterwards carried on a trade with the natives of the country, whom they called Skralingar, for a long time; this, however, ceaſed at laſt, and the country, and even its name, are now totally forgotten.

Poetry formerly flouriſhed very much in Iceland, Egil Skallagrimſon, Kormak Ogmundſon, Glum Geirſon, Thorleif Jarlaa, Skald, and Finarhelgeſon, Sighvatr, Thordſon, Gunlaug Ormſtunga, and Skad Rafn, are celebrated as great poets. The art of writing was not, however, much in uſe till after the year 1000. It is true the Runic characters were known in the country before that period, and moſt probably brought thither from Norway. Tho' we have no reaſon to believe they were cut upon ſtones, as was practiſed among us (for no Runic ſtones have been found there, whoſe age reaches to the times of Paganiſm); they uſed, however, to ſcratch them on bucklers, and ſometimes on their cielings and walls: and

and the *Laxdaela Saga* makes mention of one Olof of Hiardarhult, who had a large houſe built, on the beams and rafters of which remarkable ſtories are ſaid to have been marked, in the ſame manner as Thorkil Hake cut an account of his own deeds on his bedſtead and chair. That Runic characters were made uſe of before the introduction of the Chriſtian religion, may be proved by Olof Tryggwaſſon's Saga, where he makes mention of a man, whoſe name was Oddni, who, being dumb, made known, by means of Runic characters, that he had been inſulted by Ivar, his father's gueſt.

After the reception of the Chriſtian religion in the year 1000, the ſciences took another form. The Latin characters were immediately adopted, as the Runic alphabet, which only conſiſts of 16 letters, was found inſufficient. The firſt Icelandic biſhop, Iſleif, founded a ſchool a Skallholt; and ſoon after they founded four other ſchools, in which the youth were inſtructed in the Latin tongue, divinity,

and

and ſome parts of theoretic philoſophy. Jonas Ogmundſſon, firſt biſhop of Hoolum, ſent to Gothland in the year 1120 for one Giſle Finſon to ſuperintend the ſchool at Hoolum. Arngrim Jonſon, on this occaſion, mentions a remarkable circumſtance in his *Crymogaea*, p. 108. of the architect Thorodr, who, as he was employed in building the cathedral church at Hoolum, paid ſo much attention to the grammatical leſſons given to the ſchoolboys, as to make a conſiderable progreſs in them himſelf. The ſame author alſo mentions, that the biſhop, who was a learned and zealous man, having one day ſurprized one of the ſcholars in reading Ovid's letters, and book *De Arte Amandi*, was ſo incenſed thereat as to ſtrike the book out of his hand. At a time when no great knowledge of the Latin language could be expected even in Sweden, an Icelander however was found of ſufficient capacity and learning to inſtruct the young people to read and underſtand the Latin poets. But notwithſtanding the ſciences were there only in their

in

infancy, thoſe who deſired to make greater progreſs in them, ſtudied in foreign univerſities. Giſlur Iſleifson ſtudied at Erfurt; and many reſorted to Paris, as Samundr Sigfuſſon did, from whence they are called *Pariſk-larkar* (Paris-writers). Many, however, whoſe names are celebrated, ſtudied only in Iceland: as a proof of which, I will only mention the two moſt famous Icelandic writers, Are Frode and Snorre Sturleſon. It may therefore be affirmed that Iceland, from the introduction of the Chriſtian religion there till the year 1264, when it became ſubject to Norway, was one of the few countries in Europe, and the only one in the north, where the ſciences were cultivated and held in eſteem. This period of time alſo produced more learned men than at any other period ſince. We need only read their antient chronicles, to be convinced that they had great knowledge in morality, philoſophy, natural hiſtory, and aſtronomy. They had tolerably clear ideas of divinity, and uſed to read the Fathers: but their

poetical and hiſtorical productions, in particular, have bid defiance to time, even when ignorance was again beginning to reſume her empire. It would be an eaſy matter to mention a number of poets who diſtinguiſhed themſelves, not only in Iceland and the Orkneys, but likewiſe at the Swediſh, Daniſh, Norwegian, and Engliſh courts, as the *Skaldartal* (or liſt of poets) contains no leſs than 240: but it would be ſuperfluous to mention here any more than the three principal ones; viz. Snorre Sturleſon, who was beheaded in the year 1241, in the 63d year of his age, at Reikholt in Iceland; Olafr Huitaſkald, who died in 1259; and Sturla Thordſon, who ended his life in 1284. Some extracts of the works of theſe authors are inſerted in printed as well as manuſcript chronicles.

Of much greater importance are their ſayings or hiſtories, the utility and authenticity of which have cauſed ſo many diſputes: for if they have been conſidered by ſome as ſure and irrefragable ſupports of the hiſtory

of

of our forefathers, they have been looked upon by others as abſurd inventions and falſhoods, and belong to the ſame claſs as the hiſtory of the knight Finke, Fortunatus, the horned Siegfried, and other old womens tales. This laſt opinion is no leſs unreaſonable, than an exceſs of veneration paid to them would be inconſiderate and raſh. When they are conſulted with circumſpection and judgment, they are undoubtedly of great uſe, ſo much the more, as they are the only remaining monuments of the antient northern hiſtory; and indeed ſome of them are written with great judgment and perſpicuity.

The Araæ Frodes Schedæ were written ſince 1122, and are the moſt antient Icelandic accounts extant. The writings of Sturleſon, Gunlaug, Odde, and ſeveral others, are all of them works that will never be loſt or hurt by time; and I do not find any thing therein that ſhould induce us to deny them the ſame credit that we ſo implicitly give to the writings of Tacitus and Livy.

No one can doubt, that even thoſe authors in the compilation of their hiſtories, that have been conſidered as patterns of language, have made uſe of the information of other writers. Nor have our Icelandic hiſtorians been remiſs in this; for Sturleſon himſelf quotes an Are, a Thiodolfr, the *langfedgatal*, or genealogical table, and ſome antient ſongs that celebrated their kings; from which indeed he compiled his accounts.

The Icelanders were remarkably ſtudious in preſerving the memory of their anceſtors; and it was the moſt agreeable occupation in their meetings and aſſemblies, to repeat thoſe hiſtories and poems for which their great men had been renowned, as was alſo the practice among the Greeks. Add to this, the contents and compoſition of the writings themſelves plainly prove, that the authors have not been inclined to relate marvellous ſtories; and it would be unjuſt to refuſe them that reliance on their veracity, which we without heſitation beſtow

ſtow on other writers of the ſame claſs.

The greateſt part of their works were compoſed in the 11th, 12th, 13th, and 14th centuries; and ſome of them have even appeared in print. I have a liſt of theſe hiſtories in my poſſeſſion; and though they are by no means of the ſame degree of merit, it will perhaps not be diſagreeable to you to have a copy of the liſt, as it is not only a proof of their love of ſcience, but likewiſe of their application.

As a further inſtance of their accuracy and aſſiduity in ſtudy, I muſt likewiſe mention their chronicles, in which they recorded whatever happened of importance both in Iceland and abroad. Theſe annals are in general conſidered as more authentic than their ſayings. Semundr and Are Frode were the firſt who introduced them, and they have ſince been continued down to our days. The following are conſidered as the beſt:

1. *Flateyar Annals*, that reach to the year 1395, and to which,

2. *Vatnsfiardar Annals* is a ſupplement that extends to 1660.

3. *Skallholt.*

4. *Hola.*

5. *Odda.*

6. *Biurns a Skardzaa* to 1645, of which,

7. *Heſts Annals*, that continues down to the year 1718, is a ſupplement. *Hrafnagils Annal* begins where the laſt leaves off, and continues to 1754.

8. *Odds Ejrikſonar a fitium* to 1680.

9. Annales Regii, that reach to the year 1341.

10. *Hirdſtöra.*

11. *Laugmanna.*

12. *Biskupa.*

13. Annales antiqui.

14. Annales vetuſtiores reach to the end of the 13th century. *Bjarne Halldorſon*'s Annals, as I have been informed, begin about the middle of the 7th century, and reach quite to 1772.

But even here the ſciences have been ſubject to the ſame revolutions that they have experienced every where

elſe. The luſtre in which they had maintained themſelves ſo long, was ſucceeded by the moſt profound obſcurity. To give a clearer idea of this, I ſhall borrow the expreſſions of the learned biſhop of Skallholt, Dr. Finneus, on this occaſion, who compares the ſtate of the ſciences in Iceland to the four ſtages of human life, in his well-wrote Hiſt. Eccl. Iſlandiæ. The infancy extended to the year 1056, when the introduction of the Chriſtian religion produced the firſt dawn of light. Their youth till 1100, when ſchools were firſt eſtabliſhed, and the education and inſtruction of youth began to be more attended to than before. Their manly age laſted till about the middle of the fourteenth century, when Iceland produced the greateſt number of learned men. Old age appeared towards the end of this ſame fourteenth century, when the ſciences gradually decreaſed, and were almoſt entirely extinct, no work of any merit appearing. Hiſtory now drooped her head, poetry had no reliſh, and all the other ſciences were

enveloped in darkneſs. The ſchools began to decay, and in many places they even had none at all. It was very uncommon for any one to underſtand Latin, and few prieſts could with fluency read their breviary and rituals.

But this was not the caſe alone in Iceland, the greater part of Europe experienced the ſame change. For the dawn of a more bright day that had begun to ſpread from Greece over Italy and the ſouthern part of Europe, after the taking of Conſtantinople by the Turks in 1453, had not yet penetrated to the north. Whatever bore the name of learning was not only deſpiſed; but ſo groſs was their ignorance, that men of the higheſt rank, both ſpiritual and temporal, were incapable of writing their names. We cannot wonder at this in Iceland, when the hiſtory of the church affords ſo many examples of biſhops who were preſent at councils, at the concluſion of which they cauſed to be written under the acts, *quoniam Dominus N. Epiſcopus ſcribere neſcit, ideo ejus loco ſubſcripſit N. N.* We are alſo informed, that the ignorance

ignorance of this age was ſo great, that ſcarce any Swediſh king before Guſtavus I. knew how to write his name. In the annals of *Konungaoch Höfdinga ſtyrelſe* (ſuppoſed to be written by biſhop Brynolf Carlſſon, who died at Skara in 1430) it is ſaid, no more ought to be required of a ſovereign, than to know how to read, underſtand, and explain his letters.

The Reformation produced here, as in moſt places, a new dawn of knowledge. Some time before a printing preſs had been brought to Iceland, biſhop Giſſur propoſed to open a new ſchool in the convent of Videy, which had been ſeized by the crown; but as this had been deſigned for a dwelling-place to the king's receivers of the cuſtoms, Chriſtian III. in the year 1552, commanded that a ſchool-houſe ſhould be built near each of the cathedral churches; that at Skallholt for forty ſcholars, and that at Hoolum for thirty-four; but ſince they have been reduced, the one to thirty-four, and the other to twenty-four ſcholars. Each of theſe ſchools was to be provided

vided with a rector and an aſſiſtant teacher; and the king appropriated as much land to theſe foundations, as was ſufficient to afford tolerable ſalaries to the teachers, and board, books, and cloathing to the ſcholars gratis, ſo long as they remained at ſchool.

Great pains have ſince been taken to appoint men of known abilities as teachers to theſe ſchools; and young men are ſo well inſtructed there, that few of the clergy ſtudy any where elſe. Many Icelanders, however, ſtudy at Copenhagen; and in the year 1773, there were no leſs than fifty-four at that univerſity, where excellent regulations have been made for the ſupport of poor ſtudents. Some likewiſe ſtudy in foreign univerſities; and between 1760 and 1770 a native of Iceland, Paul Widalin by name, died at Leipſic, who was univerſally beloved and eſteemed there. A Mr. Thorotti, who has been above three years at Upſal, has likewiſe on all occaſions ſhewn himſelf a man of great merit.

We ſhould therefore form a very wrong judgment of Iceland, to imagine

gine it abſorbed in total ignorance and obſcurity: on the contrary, I can affirm, that I have found more knowledge among the lower claſs, than is to be met with in moſt other places. You will ſeldom find a peaſant who, beſides being well-inſtructed in the principles of religion, is not alſo acquainted with the hiſtory of his country, which proceeds from the frequent reading of their traditional hiſtories (*ſagas*) wherein conſiſts their principal amuſement: nor is it uncommon to find perſons among them who can repeat the poems of Kolbein Grimſon, Sigurd Giſle, and Gudmund Bergthors by heart, all of whom were poets that flouriſhed in later times; and among whom Vigfus Jonſſon has particularly diſtinguiſhed himſelf by his wit, though ſometimes at the expence of decency. The clergymen ſpeak Latin well; and I have found better libraries in many parts of Iceland than could have been expected.

A learned ſociety was erected here, which is ſpoken of in the preface of the above-mentioned Speculum Regale

gale under the name of Societas inviſibilis; and I was intimately acquainted with the rector Halfdan Ejnarſon, and the late ſyſſelman Bjarne Halldorſon, who were both members of that ſociety, though I believe it does not exiſt at preſent. I could mention ſeveral whoſe learning and taſte did honour to their country, but I ſhall only name thoſe who have acquired moſt fame in the literary world.

Among theſe the biſhop of Skallholt, Dr. Finnur Jonſon, deſerves the firſt place; who, beſides many learned writings on the antiquities of Iceland, ſome of which have been publiſhed, has lately preſented the public with an eccleſiaſtical hiſtory, in three volumes quarto, replete with information, criticiſm, and erudition. I was happy in becoming more intimately acquainted with this worthy prelate, who has been biſhop ever ſince 1754, and found no leſs inſtruction than pleaſure in his company. You may eaſily conceive how much I wiſhed, at taking leave of him, that his advanced age would permit him to

put a finiſhing ſtroke to his other works. We have ſome reaſon to hope for this at preſent, as one of his ſons, the learned Mr. John Finſſon, has lately been appointed his father's aſſiſtant and provoſt.

To this number alſo belong Halfdan Ejnarſon, rector of the ſchool of Hoolum, who has publiſhed the Speculum Regale, and is now employed in writing the Hiſtoria Literaria Iſlandiæ. The provoſt and miniſter of Hiardarholt, Gunnar Paulſen, is juſtly celebrated on account of his great knowledge in antient poetry. Bjarne Jonſen, rector of the ſchool at Skallholt, compoſes very good Latin verſes, and has a diſſertation of *Gangdagarne* ready for the preſs. Bjarne Paulſen, in company with Eggert Olofsen, made a journey through Iceland to collect manuſcripts and curioſities at the expence of the ſociety of ſciences. The lagman Sven Solveſen has publiſhed ſeveral law-works; as has likewiſe the vice-lagman Jon Olſſon, and the provoſts Vigfus Jonſen and Gudlaug Thorgeirſon, beſides ſeveral others.

The profeſſor and counſellor of ſtate, Erichſen, who is not ſettled in Iceland,

is likewiſe known on account of many diſſertations on antiquities, and is a uſeful member of the Collegii Magnæani. Arnas Mägnaus, Torfeus, and ſeveral other Icelanders, have alſo particularly diſtinguiſhed themſelves for literature in this and the former century. I ſhall give a fuller account of them in another letter, wherein I propoſe to treat of the Icelandic antiquities in particular, where I ſhall alſo mention thoſe who have peculiarly diſtinguiſhed themſelves in that branch of literature.

The language in Iceland is the ſame as that formerly ſpoke in Sweden, Denmark, and Norway, and has preſerved itſelf ſo pure, that any Icelander underſtands the moſt antient traditional hiſtory, as eaſily as we do letters written in the time of Charles IX. The general change that took place in the northern language during and after the time of Erick of Pomerania, did not extend to Iceland, tho' ſome trifling alterations were afterwards made in it in the fifteenth century, by the introduction of religion and their trade

trade with the Danes, Engliſh, and Germans. Near the coaſts ſome Daniſh is underſtood, and ſome even ſpeak it; nor is it uncommon for a peaſant to ſay, *Salve domine*, *bonus dies*, *bonus veſper*, *gratias*, *proficiat*, *dominus tecum*, *vale*. Notwithſtanding, I cannot agree with Sperling in conſidering the language as being more Daniſh than Icelandic, ſince not a ſingle word of Daniſh is underſtood in the interior parts of the country. The great pleaſure they find in reading their traditional hiſtories, has contributed not a little to preſerve the language in its purity.

You have yourſelf treated of its origin in the preface to your Swediſh-Gothic Dictionary; and one may form the beſt judgment of the language from Olof Tryggwaſſon's and ſome other hiſtorical traditions (*ſagas*), that were written in the eleventh, twelfth, and thirteenth centuries, when it was in its greateſt purity. But as theſe works are not in every perſon's hands, I will here inſert a copy of the Lord's Prayer as a ſample, both as it was expreſſed

preſſed and printed in 1585, and in 1746, which will clearly point out the ſmall change that the language has undergone during a ſpace of near 200 years.

1585.

Fader vor thu ſem ert a himnum. Helgjſt nafn thitt. Tilkome thitt riike. Verde thinn vilie ſo a jordu ſem a himne. Gief oſs i dag vort dagligt braud. Og fyrerlat oſs vorar ſkullder, ſo em vier fyrerlautum vorum ſkulldunautum. Og inleid oſs ecki i freiſtne. Helldr frelſa thu oſs af illu, thuiat thitt er riikit, maattur og dyrd um allder allda. Amenn.

1746.

Fader vor thu ſem ert a himnum, helgesſt thitt nafn, tilkomme thitt rike, verde thin vilie, ſo a jordu ſem a himne. Gief thu oſs i dag vort daglegt braud, og fyrer gief oſs vorar ſkullder, ſo ſem vier fyrergiefum vorum ſkulldunautum, og innleid oſs ecke i freiſtne, helldur frelſa thu oſs fra illu, thuiad thitt er riiked og maattur og dyrd um allder allda. Amen.

In regard to the pronunciation, they have four different dialects. Thoſe who dwell on the eaſt ſide of the country, drawl out their words in pronouncing them, which is not done in other places. On the weſtern ſide they have many words which are peculiar to that part of the iſland; and in Snefialds Jokul the *aa* is pronounced as *ai*. In the ſouthern part of Iceland *o* is pronounced ſhort before *r* in certain words, as for example in *hvoriger*, *moraudt*, and others, though they are commonly long in other parts. In the northern part of Iceland the words are quite of different genders, as *ſkur*, which is uſually feminine, but there is maſculine; and *klara*, maſculine, but is there feminine. In South Iceland I have obſerved the following pronunciation:

A is pronounced au in tha
Aa —— au — aara
Ll —— dl — gamall
Au —— ö — thau
U —— ö — upp
Ae —— ei — vaere
Ja —— iau — hia

O	———	ou —	moder
Gu	———	guö —	Gud
Y	———	i —	fyrer
Aef	———	aep —	kiaefda

Their alphabet conſiſts of the ſame letters as ours, except the (th), which character we have loſt, together with the pronunciation; the Engliſh have yet preſerved it, though foreigners find it difficult to pronounce.

We have an Icelandic grammar of Runolph Jonſon, printed in quarto at Copenhagen in 1651: it was alſo printed in Hickeſii Elementa liguarum ſeptentrionalium, Oxford 1688, and again in his Theſaurus, Oxford 1703. But the manuſcript of Jonas Magnuſens's Grammatica Iſlandica, in your poſſeſſion, Sir, is more complete, and deſerves to be publiſhed, as likewiſe Eggert Olſen's Orthographia Iſlandica. The moſt antient Icelandic dictionary we have is the Wormii Specimen Lexici Runici, compiled by Magnus Olafsen, and was publiſhed in folio, at Copenhagen, in 1650.

After-

Afterwards Gudmundi Andreae Lexicon Iſlandicum was publiſhed by Reſenius at Copenhagen, in quarto, in the year 1683. This was followed by Verelii Index linguae vet. Scyto-Scandicae, that Rudbeck cauſed to be printed in folio, at Upſal, 1691, and by two Lexica Latina Iſlandica, both publiſhed in quarto at Copenhagen, the one in 1734, and the other in 1738; to theſe Rugman's Monoſyllaba Iſlandica Lat. Explicata, Upſala, 1676, in octavo, may be added. In the library at Upſal was a copy of a manuſcript Lexicon Iſl. Lat. which I have brought with me from Iceland. In the Antiquity Archives is likewiſe a very ample work of Gudmundr Olafsen, that has been augmented and reduced to order by Mr. Aſſeſſor Gagnerus, but however moſt probably will never be printed for want of a publiſher. It is to be lamented that Runolph Jonſon was never able to publiſh his Lexicon Iſlandicum, though a privilege was granted him for that purpoſe in May 1650: we may however ſoon expect to have ſomething

more perfect on this ſubject, as the Collegium Magnaeanum in Copenhagen have promiſed to continue the important indexes, with which they have ſupplied the *Kriſtniſs* and *Gunlaug Ormſtunga* Sagas.

LETTER

LETTER XV.

To Chevalier IHRE.

Of Printing in Iceland.

Stockholm, Sept. 12, 1774.

I SAID in my laſt letter that the art of printing was introduced in Iceland a ſhort time before the Reformation. But as many may be ſurprized that books were printed there ſo early, I ſhall endeavour in this to treat more at large of the different printing offices in Iceland.

One of the moſt famous, but at the ſame time moſt illiterate and turbulent biſhops in Iceland, was John Areſon, biſhop of Hoolum. He made uſe of many arts, and particularly of his zeal for the Roman Catholic religion, to undermine the king's power, and hinder the progreſs of the reformation. His plots however ſucceeded ſo ill, that he was beheaded in 1550. As this man was extremely ignorant,

and had not the leaſt knowledge of the Latin language, which however was made uſe of in letters of excommunication, and other ordinances, he commiſſioned a friend to procure him a perſon well verſed in Latin, who might at the ſame time eſtabliſh a printing-office. For this purpoſe John Mathieſſon, a native of Sweden, was recommended to him, and he arrived in Iceland between 1527 and 1530.

I cannot determine with certainty whether he was in orders at his arrival in Iceland; however I am inclined to believe he was, from the appellation of Sira being given him after his arrival, which is a term applicable to the clergy. The biſhop immediately appointed him to the prebendary of Bridebolſtad and Veſturhopi, and he enjoyed that ſituation till his death in 1567, when at a very advanced age. Beſides ſeveral other children he left a ſon whoſe name was John, and a printer there in the time of biſhop Guthrandr: he was ſucceeded in the printing-office by his ſon Brandur.

John

Jon Brandſon, ſon of the latter, died in an advanced age in 1681, as provoſt of Hytarnas. His ſon Jon Jonſen, a clergyman, died in the ſame place in 1732. The whole family is now reduced to poverty.

The printing-office was immediately eſtabliſhed; and in 1531 John Mathieſſon printed the firſt book in Iceland, which was the Breviarium Nidaroſienſe. There was likewiſe an edition of this book printed at Drontheim, the editor whereof was archbiſhop Erick Walkendorf, but it is now very ſcarce. I do not remember to have ſeen this edition mentioned any where, except in the 28th number of the Daniſh Magazine, where a copy of it is ſaid to be in the library of Mr. Klevenfeldt. But in regard to the Icelandic edition, it is generally believed, that not a ſingle copy of it remains, ſince the only one I ever heard of was in Arnas Magnaei's library, that was conſumed in the fire at Copenhagen in 1728.

Beſides the Breviarium Nidaroſienſe, he printed the *Haadbok Præſta* (an Ec-

cleſiaſtical Manual) Luther's Catechiſm, and other books of the ſame ſort. Printing however did not go on very well till 1574, when biſhop Guthrandr Thorlakſon ordered new types to be brought thither; whereupon, amongſt other books, the Icelandic Bible appeared in print in folio, in the year 1584. The printing-office was at this period ſo well provided with types, that two preſſes were employed, excluſive of thoſe at Hoolum, where ſeveral books were printed and publiſhed about that time. The Icelandic code of laws was printed in 1578, at Nupufell, twelve miles from Hoolum, as likewiſe the Viti Theodori Summaria in 1589.

The printing-office at Hoolum was taken from Thord Thorlakſon in 1685, and transferred to Skallholt; where one-and-forty different books were printed: the firſt of which was *Paradyſar Lykell*, likewiſe *Forfadra Bok* in 1686; and the laſt, *Boenabok Sira Thordar Bardarſonar Med Vika Saung Olearii. utl. af Sira Steines*

Steines in 1697. But in the beginning of this century the printing-office was again removed to Hoolum, after biſhop Bjorn Thorleifson had bought it, together with the privileges granted to it, for five hundred rix-dollars; and the firſt book publiſhed on the revival of printing at this place, was the Paraphraſis Medit. Doct. John Gerhardi, 1703. Since this time, ſome hiſtorical books, among which I will mention the life of Guſtavus Landkronas, publiſhed at Hoolum, in 8vo, 1756, tranſlated from the Swediſh into the Icelandic language, have always been publiſhed here; the greateſt part of them however are religious books. A new privileged printing-office has likewiſe lately been eſtabliſhed at Hrappſey, by Olafr Olſſen, where ſeveral valuable books have been printed already.

A liſt of Icelandic books might perhaps not be improper in this place; but as I am unable to furniſh you with a complete one, I did not think it worth while to ſend you a catalogue of

of about three hundred that I am acquainted with; of which number however I am happy to have upwards of one hundred now in my library.

LETTER

LETTER XVI.

To Chevalier IHRE.

Of the Remains of Antiquity in Iceland.

Stockholm, Dec. 21, 1774.

Dear Sir,

HOW infinitely happy ſhould I be, were I able to ſatisfy your curioſity in reſpect to the great number of remarkable and antient monuments with which Iceland is ſuppoſed to abound: but this is out of my power; all the information I can give you amounts to no more than that the country is ſo deſtitute of them, that it is in vain to go in ſearch of any antiquities deſerving the leaſt notice. There are however ſome ruins of an old caſtle near Videdal, which was formerly about two hundred perches in circumference: the remains on the north ſide are about twenty fathoms

fathoms in height, though they are very low toward the ſouth. Near the parſonage Skaggeſtad, at Laugernas, are likewiſe ſome ruins of a leſſer caſtle, but it is not known by whom, or when it was built. In other places are remains of heathen temples; viz. at Midfiord, Godale, Vidvik, and others: at Hegranas is a kind of antient place of execution; there are alſo ſeveral burying-places from the times of paganiſm, among them I ſhall only mention Thorleif Jarlaſkalds, ſituate on a ſmall iſland in the Oxaraa. Some old ſwords and helmets have likewiſe been found, but they have not cleared up any part of hiſtory. On the heaths of Thingmans and Threkyllis are two great ſtones ſtanding upright, which moſt probably were erected as monuments to the memory of ſome deceaſed perſons, according to Odin's regulation. This cuſtom, which was long practiſed in the North, has from thence been brought to Iceland; though it was not uſual in Sweden till a long time after to put any inſcription on the monu-

monument. I have been told, that ſome years ago, forty ſmall figures of braſs were found in the ground near Flatey, repreſenting animals and other objects; bnt unfortunately they fell into the hands of people who did not know their value, conſequently they have been all loſt.

There are no other monuments remaining of Sturleſon, beſides his writings, but a mount over-grown with graſs at Reikholt, which is ſaid to have been raiſed from the ruins of his houſe; *Sturlunga Reitur*, the burying-place of his family; and at a little diſtance from them, *Snorra Lang*, one of the fineſt baths in all Iceland. This bath, which is large enough to contain 50 perſons at one time, is incloſed with a wall of baſalt, and bath incruſtations; it has a ſmooth level bottom, and is ſurrounded with benches. In Sturleſon's time a long covered paſſage led from thence to the dwelling-houſe, ſo that the bathers retired from the bath without being expoſed to the cold. The ſpring is at forty paces diſtance, and is called *Scribla*, and

the water from it is conveyed to the bath through a conduit made of ſtones. At the end of this conduit is a hole in a rock, which is ſhut with a ſpigot and faucet, through which you let in as much warm water as you think fit; this, when too hot, may be eaſily cooled by the water from an adjoining brook.

Theſe are almoſt the only antient monuments Iceland affords, and what, as you will readily allow, are of very little importance. There are no antient manuſcripts, Icelandic ſagas, or hiſtorical traditions or accounts to be met with, the iſland having been entirely ſtripped of them, owing to the zeal and induſtry of the antiquarians and others, who formerly reſorted in numbers to this country for the ſole end of collecting them.

The honour of having firſt begun to collect them belongs to Sweden: the firſt who undertook it was Jonas Rugman, who went to Iceland in 1661, at the expence of the court of Sweden, where he obtained a number of manuſcripts, which laid the foundation for

the collection of Icelandic original records, that are contained in the Swediſh archives of antiquities. Encouraged by his example, Thormodr Thorfveſon likewiſe went to Iceland, furniſhed with an order from king Frederic the Third, of the 27th of May 1662, to the biſhops Bryniolf, Svenſſon, and Giſle Thorlakſon, to aſſiſt him in collecting Icelandic manuſcripts.

After the eſtabliſhment of the college of antiquities it was propoſed to ſend Peter Salan to Iceland; but this did not take place, though they gained their point ſome time after, in 1680, by means of Gudmundr Olſon, who prevailed upon his brother Helge Olſon to leave Iceland and come to Sweden, whither he brought a conſiderable number of manuſcripts. Great additions were afterwards made to theſe collections by Arngrim Jonſen, Jonas Wigfuſen, Lopt Joſephen, Gudmund Gudmunderſon, and Thorvaldr Brockman, and who were all employed as tranſlators by the college of antiquities. Jonas Eghardſen, Magnus Benedictſen, Iſleif Thorleifsen, Ejnar Ejnarſen, Arnas Hakanſen, Francis Jacobſen, and

Thord

Thord Thorlakſen have alſo very much enriched the collection, both when the college of antiquities was at Upſal, and when it was afterwards transferred to Stockholm.

The attention of the Daniſh court was at laſt excited: king Chriſtian the Fifth, the 4th of April 1685, diſpatched Thomas Bartholin to Iceland, with an order to the bailiff Heidemann to aſſiſt him in collecting Icelandic antiquities: he forbad at the ſame time, in the ſtricteſt manner, any manuſcripts, hiſtories, or other accounts relating to Iceland, to be ſold to foreigners, or carried out of the country.

Stockholm, as well as Copenhagen, became therefore poſſeſt of a conſiderable number of antient Icelandic writings; but the latter court not ſatisfied with what they had already obtained, diſpatched Arnas Magnäus and Paul Widalin to Iceland in 1712; where they ſought for whatever might remain there with ſuch extreme care, that it is almoſt impoſſible to get ſight of any manuſcript hiſtory in the whole country; and notwithſtanding the pains

I have

have taken, I could only by purchaſe obtain an imperfect copy of the Sturlunga Saga.

It is in vain, therefore, to enquire for antient Icelandic chronicles in Iceland; for beſides the fine collection in the Swediſh archives of antiquities, there is a very admirable collection of them in the library of the academy at Copenhagen, that was a gift of Arnas Magnäus; beſides ſeveral ſmall collections of leſs importance in the hands of private perſons.

I have already mentioned the Icelandic hiſtories that have been publiſhed: ſome of them were printed in Iceland, among which thoſe printed at Skallholt are very rare; but the greateſt part have been publiſhed in Sweden, though ſometimes from very imperfect manuſcripts. Olof Rudbeck the elder, Verelius, the two Peringſkolds, Renhielm, Biorner, Salan, and Brokman, have however acquired a great deal of merit by the care and diligence that they beſtowed upon them. None of theſe editions how-

ever can be compared, in point of elegance and criticiſm, to thoſe publiſhed in Copenhagen, by the Magnäanian College, the continuation of which is expected with great impatience by the literary world.

LETTER

LETTER XVII.

To Baron AXEL LEJONHUFWUD.

Of the Icelandic Poetry.

Stockholm, Dec. 12, 1775.

IT is with the utmoſt pleaſure that I prepare to obey your commands, in communicating to you a ſhort account of the Icelandic poetry; I only lament that my knowledge is too limited on a ſubject that is ſurrounded with ſo many obſcurities, and will therefore not permit me to make my account as perfect as I could wiſh, and as the importance of the ſubject requires: I regret this inability ſo much the more, as I am to ſubmit my thoughts to the eye of ſo great a judge; but if even my obſervations ſhould not be very important, I ſhall nevertheleſs conſole myſelf, as they will, however, be a proof of my readineſs to comply with your wiſhes.

Though the opinion of ſome men of learning, that writing in verſe has been more early practiſed in Europe than writing in proſe, may at firſt appear extraordinary, yet it ſeems more probable upon nearer examination. The poets among the Greeks and Romans were more antient than their hiſtorians and moſt celebrated orators. The time when proſe firſt began to be wrote among theſe nations may be aſcertained with tolerable accuracy; but it is almoſt impoſſible to determine the age of poetry among them, as it is far more antient than the ſiege of Troy and the Olympic games. In the ſame manner we know that the firſt work in proſe among the Romans was the ſpeech of Appius Caegius to the ſenate and Roman people in the 125th Olympiad; in which he adviſes them to refuſe the conditions of peace offered by Pyrrhus, when it is certain that poetry had been known and cultivated among them long before.

This need not be wondered at, when we recollect that long before the knowledge

ledge of letters could have become general in Europe, many actions might, however, have been thought worthy to be conſigned to poſterity. How great an aſſiſtance muſt it have been to the memory, when the remembrance of an event, deſtined to be reſcued from oblivion, was preſerved in words, compoſed according to a certain meaſure, where it might be determined, even by the ear alone, if any word had been omitted or altered! The laws of the antient Germans were written in verſe, and the ſtanzas in which they were compoſed were generally ſung. The French monarch, induced by the favourable reception given to every poetical work, cauſed the Bible to be tranſlated into verſe in the ninth century: and from the ſame motive Ottfried, a Benedictine monk in Alſatia, tranſlated the four Evangeliſts into German verſe about the ſame period.

Thus we ſee that poetry is extremely antient among all nations; and in Sweden it may be conſidered as a legacy

of Odin, who firſt brought it thither. In antient times there was no king or chief, or any other man of note, that had not his own ſkald or poet, who was obliged to be preſent on all important occaſions, to remark whatever was worthy of attention, and to relate it in ſongs. He was preſent at battles in the *Skoldborg*, or in the midſt of the braveſt warriors, that he might behold with his own eyes thoſe actions which were to be recorded: at their banquets he was obliged to animate the gueſts with happy inventions and poetical encomiums on their deceaſed heroes. Theſe poets were every where held in high eſteem; they were conſtantly admitted to the king's preſence, and frequently were his generals as well as his miniſters. They were called *ſkaldr*, which Chevalier Ihre derives from *ſkial*, reaſon or prudence, from whence the expreſſion of *ſkiálamán*, wiſe men. They were likewiſe called *ſpekingr*, from *ſpeke*, wiſdom, from whence the Engliſh word to Speak, derives its origin.

To

To the ſongs of theſe poets we owe the firſt accounts of the Swediſh hiſtory, and cannot therefore deprive them of the honour Tacitus beſtows on them in calling them Antiquiſſimum annalium genus. Our antient traditions are likewiſe filled with theſe ſongs, which we cannot alter or reject as worthleſs, though they are for the moſt part unintelligible to us. The cauſe of this is, firſt, that the Skalds purpoſely compoſed their ſongs with ſo much art, that they were not only unintelligible to the vulgar, of which we find examples in Giſla Sturſonar, Viga Glums, and Greltis's Sagas; but they were not even underſtood by the greateſt poets, of which Gretter's hiſtory gives us a proof.

Secondly, they were alſo accuſtomed to tranſpoſe the order of the words in their ſongs in ſo ſtrange a manner, as neceſſarily augmented the obſcurity. I will only mention one example of this from Renhjelm, where the words, to follow in their natural order, ought to

have been ranged according to the numbers here placed over them:

1 2 8 9
Hilmir vann at holmi
5 7 6
Hialm-ſkoth rothni blothi
3 14 15 13
Huat ofduldu theſſ hoeldar
4 10 11 12
Hoerd oc auſtur i goerthom
18 20 17 19
Rogs bra Recka laegir
10 22 21
Riikur valkera lijki
23 24 27
Herſtefnir let hrofnum
25 26 28
Hold ſlaemingia goldit.

They had, thirdly, a particular poetical language (*Skaldskaparmal*) which was very copious, but could not be made uſe of in common life. This language probably made one of the principal parts of their learned ſtudies in thoſe times, as they were not inſenſible

ſible of its beauty and elegance. Thus for example, there are upwards of fifty ſynonyma of the word *bölja*, billow or wave. And Chevalier Ihre quotes Lopt Guttormſon's Lyodalykil (a love-ſong) in which there are 147 different appellations, that all expreſs the word woman. I ſhall borrow a few lines of this poem, which are mentioned in the Edda among the *Hringaheiti*, and that prove how far theſe poets went in their Antonomaſias,

Heigni eg hamri kringdan
Hang a riupu tangar
Grymnis ſylgs a galga
Gynnung bruar linna.

The natural diſpoſition of theſe words is this: *Eg heingi hamri kringdan linna gynnung a hang riupu bruar tangar a Grymnis, ſylgs galga*; which means, I hang the round beaten gaping ſnake on the end of the bridge of the mountain bird, at the gallows of Odin's Shield. To find the ſenſe of theſe words, Mr. Ihre obſerves, that by the gallows of Odin's Shield is meant the arm,

arm, on which it is uſual to wear the ſhield. By the word *ripa* is underſtood a falcon, for a Skald has the permiſſion of putting one genus for another. The bridge of the falcon is the hand, on which the falconer places him, and its end or tong (tongue) is the finger. The gaping round beaten ſnake means a ring; and conſequently this long ſtory means no more than, I put a ring on my finger.

Fourthly, to make themſelves ſtill more unintelligible, when too words had the ſame ſound, the Skalds were allowed the liberty of putting the periphraſis of the one for the other: for example, the word *hof* ſignifies a horſe's hoof or foot; but the ſame word likewiſe means decency, moderation, underſtanding; and to expreſs this the horſe's hoof was frequently made uſe of. But the principal difficulty in the explanation of this antient poetry proceeds from the extreme incorrectneſs of the manuſcripts of our Sagas, particularly of the poetry, which cannot be read correctly without great attention. Theſe are the cauſes why the

greater

greater part of the verſes in their Sagas, publiſhed either in Iceland itſelf or in Sweden, cannot be underſtood; only very few are capable of comprehending them; that it is however poſſible, is proved by the new editions of Kriſtnis Saga, Landnamabok, and ſeveral others. The provoſt Gunnar Paulſen, in Iceland, is particularly diſtinguiſhed for his great knowledge in this branch of literature.

The difficulties we meet with in aſcertaining the true ſenſe of theſe antient poems, is likewiſe the cauſe of the contempt with which we conſider theſe few remains of the genius of the antients. I will readily acknowledge they have no poem that can be propoſed as a pattern of wit and elegance; yet it cannot be denied, but that very ſublime thoughts and expreſſions, and ſometimes very beautiful compariſons, are to be met with in them: and it is impoſſible to read the dying Lodbrok's Biarkamal, Eigils, Hofud, Lauſn, and Ejvindrs Haconarma, without pleaſure, beſides ſeveral others.

They

They choſe for the ſubject of their poetry whatever happened in common life; however they principally occupied themſelves in compoſing ſongs in praiſe of the actions of their great men; in which they are accuſed of not being over ſcrupulous in beſtowing their flatteries. We have ſeveral poems exiſting on various ſubjects, among them there is a tolerable epic one on Charles and Grim, beſides another on Hialmar. They have likewiſe ſome ſatirical pieces, which they uſed to call *nidviſor*, and the undertaking of the author was named *yrkia nid*; but there are no traces of their having had the leaſt idea of theatrical performances.

From what has been ſaid, it may be imagined that there is no language that allows a poet ſo much liberty as the Icelandic; and indeed there is no language ſo rich in poetical expreſſions as this: it muſt not however be thought that it is confined by certain rules: on the contrary, I believe there is no proſody ſo copious as the Icelandic, as, according to

the

the Edda, they had no leſs than 136 different ſorts of verſifications (in Icelandic *hattur*) each of which had its particular rules. However it will be extremely difficult, nay almoſt impoſſible, to ſay any thing certain on this ſubject, before we have a true explanation of that part which treats of it in the third volume of the Edda.

The Edda is one of the moſt celebrated remains of antiquity, and yet it has hitherto been very imperfectly known. It has generally been conſidered as the mythology of the antients, and the *Voluſpa* and *Havamal* have been forced upon it, as two of its volumes, though they do not in the leaſt belong to it. But Chevalier Ihre has thrown more light on this affair: in his printed letter to Mr. Lagerbring, he has attentively examined the manuſcript of the Edda, in the library at Upſal, and clearly proves that it is nothing more than an introduction to Icelandic poetry, conſiſting of three parts; the firſt, *daemiſagor*, is an extract from the Hiſtoria mythica veterum:

rum: the ſecond, *kenningar*, is a mere Ærarium poeticum; and the third, *liods greiner*, contains the Icelandic proſody, &c. &c. The ſo-called *dæmiſagorne*, are for the moſt part tranſlated into the Swediſh language by Goranſon, but the tranſlation is very incorrect. Reſenius has likewiſe publiſhed them together with the *Kenningarne* in Latin. But the third part, that deſerves no leſs attention, has not yet appeared in print; and it is much to be wiſhed that Chevalier Ihre would give it to the public, as there are ſo few beſides himſelf capable of doing it juſtice.

The various conjectures that have been formed concerning the true author of the Edda, have been no leſs erroneous than thoſe relating to the ſubject of the book itſelf. It has generally been thought that Samundr Sigfuſon, who died in 1133, wrote a very ample work, intituled, The Edda, which treated of many important ſubjects, and was in a manner a magazine of all human knowledge; of this however ſcarce one

third has ever been preſerved, and tranſmitted to us in the preſent Edda. But Chevalier Ihre aſſerts, that the Edda we are now in poſſeſſion of, has not been extracted from any one more antient, but that is was originally compoſed by Snorre Sturleſon.

The difficulties and objections that have been made againſt this opinion by the learned Arnas Magnäus, and afterwards by profeſſor Schloſern, can eaſily be removed; for moſt probably Sturleſon's Edda has been continued by the monk Gunlaug, as Bjorn of Skardſaa ſuppoſes, or rather by Olafr Hvitaſkald. It is therefore not ſurprizing, that ſomething in praiſe of Sturleſon ſhould be inſerted; and it may eaſily be explained from hence, why the author called Waldemar, king of Denmark, his maſter.

It is difficult to determine the true nature of the antient Icelandic poetry; however, to give you ſome idea of it, I will ſay ſomething of the verſification moſt frequently uſed among them, and

and which was called *drottquade* (king's ſong).

It was divided into ſtanzas, each of which conſiſted of four couplets, and each of theſe couplets was again compoſed of two hemiſtichs, each hemiſtich contained ſix ſyllables: nor was it allowed to augment this number, except in caſes of the greateſt neceſſity. Theſe ſyllables conſiſt of three or four feet, according to the different ſorts of verſification, and ſometimes of more, in proportion to the ſhortneſs of the ſyllables. Beſides this, the Icelandic poetry requires two other things, viz. words with the ſame initial letters, and words of the ſame ſound. This aſſonance is called *hending*, and is either more or leſs; in the firſt caſe it is called *adalhending*, and in the ſecond, *ſkotthending*. This you may clearly ſee by the following example:

Auſtur londum for undann
Alvaldur ſa er gaf ſcaldum,
Hann feck gagn at gunne,
Gunntrör da ſlög morgum,

Slydur

Slydurtungur let ſlïngra
Sverd leiks reigenn ferdar,
Sende grammur ad grundu
Gullvarpathi ſnarpann.

Here it muſt firſt be obſerved, that there is in every couplet a ſyllable that governs the whole verſe, *rader quaedinni*, which is almoſt always the firſt word in the ſecond hemiſtich; and two words in the firſt hemiſtich muſt begin with the ſame letter, if it is a conſonant; but when it is a vowel, one vowel may be put for another. Thus, for example, in the above ſtanza the following words are thoſe that govern each verſe, conſiſting of two lines or hemiſtichs, *radar quedandi:* in the firſt verſe, the word *alvadur*, becauſe it begins with a vowel, has, in the firſt hemiſtich of this verſe, the words *auſtur* and *undann*; in the ſecond verſe *gunhörda*, you find *gagn* and *gunne* in its firſt half; in the third verſe *ſverd*, whence in the firſt hemiſtich *ſlydurtungur* and *ſlingra*; in the fourth verſe, *gullvarpathi*, which requires *grammur*

and *grundu* in its firſt half. Secondly, one finds in the firſt hemiſtich of each verſe a *ſkotthending*, or two words, which have equal conſonants with unequal vowels, ſuch as are in the firſt verſe, *löndum*, *undann*; in the ſecond *hann*, *gunn*; in the third, *ſlydurtungur*, *ſlingra*; and in the fourth, *ſende*, *grundu*. But in the ſecond hemiſtich of each verſe is an *adalhending*, where two words have both equal conſonants and vowels, in the above-mentioned ſtanza: words of this kind are in the firſt verſe *alvald*, *ſkaldumm*; in the ſecond verſe *gunhörda*, *mörgum*; in the third verſe *ſverd*, *ferdar*; and in the fourth verſe *gullvarpathi*, *ſnarpann*; conſequently in a ſtanza, that, like the above, conſiſts of thirty words, above one half of its peculiar properties are contained in the impoſſibility of changing one word for another, or tranſpoſing it, without making a great alteration in the whole verſe. Theſe aſſonances, or *hendingars*, are generally found in the firſt and laſt word of each line: ſometimes however the one aſſonant word is placed in the middle

middle of the line, as in the inſtance of the word *löndum*, in the firſt hemiſtich of the firſt verſe.

This conſonance of ſounds muſt be conſidered as the neceſſary ornament of a regular verſe by the antient Skalds: the greater this uniformity is, the more the verſe approaches to perfection; it likewiſe ſerves them as a guide in ſinging their verſes. We alſo find ſomething of this ſort in the Latin poets. Virgil ſays,

—tales caſus Caſſandra canebat.

And another poet,

Dum dubitat natura marem faceretve puellam,
Nates es o pulcher paene puella puer.

This has likewiſe been remarked by Boxhorn, who at the ſame time quotes from Giraldus Cambrenſis, that this was alſo cuſtomary among the antient Cambrians, and in England: ſo that it ſeems to have been the opinion of moſt nations, that the elegance of

poetry required this harmony of ſounds. For this reaſon the Cambrians ſay,

Digawn Duw da y unie
Wrth bob ćtybwylh parawd.

And the Engliſh,

God is together gamman and wiſdome.

David Rhaeſus confirms this in his GrammaticaCambro-Britannica, printed in folio, London 1592; and quotes ſeveral paſſages from their verſes, which have a great deal of reſemblance with the *hendingar* of the Icelanders.

I know not whether the agreement of the initial letters, cuſtomary in the poetry of the Finlanders, might not likewiſe be mentioned here, as a proof of the ſame cuſtom being obſerved there as in Iceland: I will therefore inſert a paſſage from Calamnii's Congratulation to the late king Adolphus Frederic, on his undertaking a voyage to Finland.

Koſta

Koſta kulki kuningamme
Adolph Ferdric armolinen
Meidan maalla matkuſteli,
Kaicki vereni venahti,
Kaicki lükathti lihani,
Ettae virteni viritin,
Kannoin minun kandeleni,
Iſaen iſtuimen etehen,
Kaickivellen kamarihin:
Ioſta anoin andimia.

But this carries me too far from my ſubject. Though we do not find any rhymes in our moſt antient poetry, it may, however, be ſaid with certainty that they are older than the introduction of the Chriſtian religion. Skule Ejnarſon is therefore wrongfully accuſed of having introduced the uſe of rhymes, that is now become ſo general; for except England, which has preſerved its blank verſe, no nation in Europe is pleaſed with verſes that do not rhyme. The art of rhyming, that is by no means eſſential to poetry, and ſtill leſs uſeful, as it only ſerves to make it more difficult, was borrowed, it is not improbable, from

the antient northern ſkalds, and has now ſpread itſelf beyond Europe; ſo that rhyming is become as univerſal as the complaint, that the number of verſifiers increaſes in the ſame proportion as the number of poets decreaſes. Baretti relates, that he heard a Moſambique ſong in rhyme from ſome negroes at Madrid. Gage ſays the ſame of the Mexicans; and Niebuhr mentions that the Arabs are great rhymers.

To conclude, I here preſent you with a ſpecimen of an Icelandic poem that Rugman compoſed on the death of count Magnus de la Gardies. It was printed at Upſal; but is become ſo ſcarce, that I doubt whether any perſon in Sweden has a printed copy of it: it may at the ſame time ſerve to ſhew the nature of a *drottquadz*, as the author has obſerved almoſt all the rules that conſtitute one:

Aut er i ſeggia ſaeti
Saknar manns i ranni

Gret

Gret ylgur Ragnvald rytto
Rom-ſtamir haukar fromaſt
Kund Lodbrokar ; kiendo
Kuillinda valir illra :
Kuóldrido klarar hreldoſt
Kueid ari már faſt reidar
Tijd fiello tar af giodi
Tafnlauſir æpto hrafnar.

Thuarr og vid thein gils dauda
Thydur morg brád, i hijdi
Skreidaſt thui berſi ſkiædur
Skiott marti gráds of otta :
Ox ódum falu faxa
Frar miog or leiptri tara
Huarma beckur ad hrockin
Hraut gron a baudar nauti.

Gretto ſkinlaus agiætann
Gripdijr heidingia ſuipuls
Verdar of fædo fordom
Fleinthings allvakran kingia
Og i oglodum huga
Undo ſier menn og hrundir
Seims kuado mundar ſoma
Sieirrhuor huit malar thuerri.

Heidingiar ef ſua hedins
Harmadu kuanar barma
Stälir ſier giordi ſtala
Stijrir og Eida hiruſt:
Thars i malmguſti giera
Grad thuarr og vod til brada
Varga kna vund oborgid
Vas, thaut rafn i aſi.

Hvad bæri oſs er erum
Urdarbrunns tha alkunnir
Sira Jofurs theſs ſara
Sueita dagliga neitum?
Og i hans erum faugru
Orda vidkuædi vordnir
Uppfræddir ad vier hreppa
Aſtundum gledi háá?

Bæri oſs ey bliugum vera
Breiſkleika holdſins veikan
Tijtt fyri ſionir ſettia
Synd flya, dygd i nijaſt?
Hel med thui hroka ſtoli
Hreikir ſier a faul bleikum
Akuedr ymſra thioda
Andlat med quiſti handar.

Hel vægir hauldum eigi
Hrijfur or theſſo lijfi
Kejſara, Klerk og Räſir
Karlmenſko fulla Jarla:
Altignum amint fagnar
Og kot-af-röpa throti
Kurteiſa kappa herſa
Kielling leggur ad velli.

Dæmi framm daglig koma
Drijir hel verk at nijo
Audlinga aburt leidir
Oſs dauggvar tara foſſi:
Mannlunga mætſta fangar
Med ſier hertekna hiedan
Færir og furdum ſtorum
Fiaurleſtir meingid beſta.

Sidpridi, ſæmd og heidur,
Somligur dygdar blomi,
Mangiæſka, vinſæl minning,
Meterda fremd ofgietin,
Frijdleikur, fegurd, audur,
Frækn, aſt, og hyller dáſto
Hel med ſier dregur i duala
Deyr tho gott mannord eije.

Einn nu af æfi banni
Afgieck raud moens brecku
Mætur altygin ytum
Æ tregandi lægir :
Kurreis, vis, kiænn, til urta
Kin-ſtor lof dunga vinur
Haborin Jarl og Herra
Haukſtandar malar grandi.

Dyr Magnus Delagardi
Dygdhár Odains bygde
Akurs viſt af var rekin,
Er nara nift illſkiptin :
Mord hauxa fall hans færdi
Fridoſtum brecko hlijda
Sorg ſtora ſua og morgum
Slædir lax hrundum fædo.

Thar fie oſs tho ad eyrir
Thad hann i gudi gladur
Als træd holds goto greida
Grand fyrtiſt vondra anda;
Hirdur i Gimlis gardi
Glatt ſingur og ſamklingir
Utvauldum Eingla ſueitum
Endalauſt lof miuk rauſto.

EPITAPHIUM.

EPITAPHIUM.

COnditur hoc tumulo juvenili mortuus ævo
Magnus, de Magna Gardia gente ſatus.
In multos canus dignus qui viveret annos,
Hei mihi! quod juvenis concidit ante diem.
Hujus enim ingenium cepit non terra. Quid inde?
Tollite Cælicolæ, reddite Cælicolæ.
Dic tumulum ſpectans oculo properante viator:
Magno Tuo Cineri ſit pia terra levis.

Scripſit Upſaliae anno 1667,
die 14 Februarii.

JONAS RUGMAN.

LETTER

LETTER XVIII.

To Professor BERGMANN.

Of the Volcanos in Iceland.

Stockholm, Sept. 1, 1773.

HAVING received the collection I made in Iceland of the specimens of the different substances of which their volcanos are composed, I take the liberty of sending it to you; adding at the same time a short account of these burning mountains, which is in part extracted from Icelandic writings, and partly founded on what I heard from the natives, as well as from my own observations; and which I do not think unworthy of your closer examination. Indeed it is much to be lamented, that since of late such care and application have been bestowed on the study of natural history, so little attention has been paid to the operations of Nature in this remarkable island; for hitherto

hitherto a very ſmall number of the many volcanos are yet fully known; but that we ſhould be more ignorant in regard to the wonderful hot ſpouting fountains with which the country abounds, is very extraordinary; not to mention many other uncommon appearances in Nature.

My time and attention have been too much confined and taken up to give you ſo complete an account of the curioſities of Iceland as they deſerve; but I flatter myſelf notwithſtanding, that you will give a favourable reception to the few obſervations I ſhall make, though they ſhould not be ſo important as might be expected. We may hope to ſee this ſubject treated upon more at large, when you have time and opportunity to compare the effects of fire in Iceland, with ſimilar ones in other parts of the world.

I will not venture to determine how far the opinion of ſome men of learning is founded on truth, that all mountains have taken their riſe either from fire or water. How

probable ſoever this opinion may appear, of which we can find no traces in the moſt remote times, and the moſt antient authors ; yet it would be very difficult, nay, almoſt impoſſible, to eſtabliſh it by experience : but be this as it may, I will venture to pronounce, that Iceland has been formed by eruptions of fire.

It is no uncommon event for iſlands to be produced in this manner ; we have many examples of it ; but the ſize and extent of Iceland, in compariſon to other iſlands, which owe their origin to the ſame cauſe, may raiſe ſome doubts againſt the reception of this hypotheſis. Nor can it be denied, but this, as well as ſeveral ſorts of ſtone that are to be found there, and which do not bear any diſtinct marks of the effects of fire, are likewiſe calculated to confirm theſe doubts. Again, I ſee nothing to hinder me from conſidering Iceland as produced by fire, when I reflect that the ground in all parts of the iſland, and particularly near the ſea ſhore, conſiſts of *lava* or *tuffa*, which is frequently co-

vered with other ſorts of ſtones, as at Lundö, and even with a hard kind of moor-ſtone (*ſaxum*) or with ſeveral ſtrata of different kinds of earth and ſtone, as at Laugarnas, where the lava is fourteen feet in depth; when I find beſides, that thoſe rocks, which have no traces of fire, are compounded of ſand mixed with ſmall pieces of ſpar, that may eaſily be produced in two or three thouſand years, ſince the lava has laid the foundation; I am ſtill more inclined to ſupport this opinion.

I am not however ſo credulous as to believe, that the whole iſland was produced at once by fire; but I rather conjecture that it has been the work of ſome centuries, by ſeveral cliffs and rocks being produced at different times, whoſe points have been connected by new eruptions, and which have formed the baſis of the whole iſland.

It is very difficult to determine, whether this ſuppoſition has any real foundation or not; however I think myſelf authorized to believe it, as well

from

from the arched figure into which the ſtreams of lava have generally formed themſelves, as from the probable connections of the ſea and the volcanos there: I likewiſe believe, that from hence it may be beſt explained, why ſeveral iſlands have been ſwallowed up in great earthquakes, as a building may ſooner be deſtroyed by tearing away the pillars on which it reſts.

Thus I go further back with regard to the eruptions of fire in Iceland, than the common tradition among the vulgar people there, who believe that the firſt inhabitants of the country, whom they ſuppoſe to have been Chriſtians and Iriſhmen, were ſo much oppreſſed by the Norwegian Coloniſts, that they were forced to leave the country, to which they firſt ſet fire, to revenge themſelves. We cannot however determine, till after the arrival of the Norwegians, how often the eruptions of fire have happened. But this nation has preſerved with great care whatever concerned their place of reſidence or habitation.

The

The firſt eruption of fire mentioned by the antient records, is the *Ildborgar hraun*, immediately after the arrival of the Norwegians on the weſt ſide of the iſland, in the ninth century. But it is not remarked as any thing extraordinary, only that the fire broke out near a farm belonging to Thore; and a ſtretch of lava, or a *hraun*, of three miles in length, and two and a half in breadth, remains to this day as a monument of it. After this there are no eruptions mentioned till the year 1000, when the Chriſtian religion was introduced there. At a time when the chiefs of the country were aſſembled to conſult about the reception of the Chriſtian religion, information was brought that fire was thrown out at Plow. The Heathens conſidered this as a proof of the wrath of their gods, on which account they were reſolved to refuſe the new religion; but this reſolution was overruled by Snorre Gode's aſking them, "On whom did the gods diſplay "their wrath, when thoſe rocks on "which we now ſtand were on fire?"

The Icelandic Chronicles mention many inſtances of fiery eruptions obſerved in different places during the ſpace of 800 years *; it is therefore difficult to conceive how Horrebow, who has been in the country himſelf, could affirm, that fire emitted only from them very rarely, and in few places.

To be ſenſible of the dreadful effects of fire, the country itſelf need only be conſidered. The mountains are almoſt entirely compoſed of lava and *tuffa*, and the plains are cruſted over with *braun*, or tracts of lava, which are, however, in many places covered with earth or turf. The accounts we have of certain eruptions of fire, alſo inform us, that they have always laid waſte large tracts of land, either more or leſs.

I will not in this place mention the damages done to the inhabitants by the aſhes thrown from the volcanos,

* The Chronicles give a liſt of ſixty-three eruptions at Heckla and other places, from the year 1000 to 1766; of which twenty-three were eruptions of Mount Heckla only.

which

which frequently covered the fields for a ſpace of twenty or thirty miles in length, and half a yard in depth, by which the cattle ſuffered very much, as it cauſed them to loſe their teeth, and frequently to drop down dead for want of food; and when they have been killed, pumice has ſometimes been found in their liver and bowels. I will only name ſome of the places ſituate neareſt to the volcanos, that have been utterly deſtroyed by their effects. This has been partly done by violent earthquakes, that generally preceded the eruption; and partly by inundations of water from the ice melted by the fire; and laſtly, by the quantity of glowing aſhes and ſtones thrown from the mouths of the volcanos, and the ſtreams of burning matter which flowed down on all ſides.

In 1311 eleven farms were conſumed near Roidekamb, and as many more near Tolledyngr; and in 1366 ſeventy at Lillehered. Heckla deſtroyed two in 1374; ſeven in 1390; and eighteen in one day in 1436. In the ſame manner five farms were laid waſte near

Myrdals Jokul in 1660, and ſtill more in 1693 near Heckla. In 1727, at leaſt 600 ſheep and 150 horſes were killed near Myrdals Jokul, by the flood and the pieces of ice that ruſhed down with it. In 1728 many farms were deſtroyed near Krafle, and a large lake called Myvatn, was entirely dried up, into which the ſtreams of fire that rolled from the mountains flowed during ſome years, and formed a tract of lava of four miles in length, and one and a half in breadth. In 1755 Kattlegiaa laid waſte ſix pariſhes; and in the ſame year the laſt eruption of Heckla ravaged a tract many miles to the north-eaſt.

It is not therefore to be doubted, but that the fire rages here with as much, and perhaps more violence than Veſuvius, Ætna, and other volcanos; notwithſtanding which, I ſee no foundation for the opinion of ſome people, who affirm that there is a communication between the volcanos of Iceland and Italy; it might be maintained with as much foundation that Kattlegiaa and Teneriff,

Teneriff, or Krafle and Lima, have communication together.

But before I quit this ſubject I will mention a circumſtance that is related both by Eggert Olafsen and Jacobſen. The laſt time that Kattlegiaa vomited fire, a flaſh of lightning, as it were, burſt from the flame, and pierced through the cliffs that intercepted its way. The ſame lightning in one place killed eleven horſes, three of which were in a ſtable; a farmer was alſo killed by it near the door of his room; his upper cloaths, which were woollen, remained entirely untouched, but his ſhirt and waiſtcoat, both of linen, were burnt; and when his cloaths were pulled off, it was found that the fleſh and ſkin on the right ſide were conſumed to the very bones. The maid-ſervant, who wanted to aſſiſt him in ſaving the cattle, was likewiſe ſtruck by the lightning, but did not die till ſeveral days after, during which time ſhe ſuffered inexpreſſible torture. It is likewiſe ſaid, that when ſhe put on her cloaths, they were ſinged by the glutinous fires that cleaved to her body. At firſt I heſi-

tated to receive this as true; but when I read in your Coſmography, that Braccini had obſerved in 1631, a column of ſmoak from Veſuvius to extend over ſeveral miles of the country, from which deadly lightning proceeded; and that the ſame happened in 1767, when the iron rods erected in Naples became electric whenever Veſuvius emitted fire; I am the more inclined to believe that there is ſomething electrical in this kind of fire, as the ſame phenomena appear in thunder and lightning.

LETTER

LETTER XIX.

To Profeſſor BERGMAN.

Of the Volcanos in Iceland.

Stockholm, Sept. 7, 1773.

IT ſcarcely ever happens that the mountains begin to throw out fire unexpectedly; for beſides a loud rumbling noiſe that is heard at a conſiderable diſtance, and for ſeveral days preceding any eruption; and a roaring and cracking in the part from whence the fire is going to burſt forth; many fiery meteors are obſerved, but unattended in general with any violent concuſſion of the earth; though ſometimes earthquakes, of which the hiſtory of the country affords ſeveral inſtances, have accompanied theſe dreadful conflagrations.

Among the traces left by theſe eruptions, are particularly the clefts frequently to be met with, the largeſt of which is Almennegiaa, near the water of Tingalla; it is very long,

and 105 feet in breadth. The direction of the chaſm itſelf is from north to ſouth: its weſtern wall, from which the other has been perpendicularly divided, is 107 feet 6 inches in height, and conſiſts of many ſtrata (each of which is about ten inches thick) of lava, grown cold at different times, as may eaſily be diſcovered by the apparent cruſt, that is full of bliſters of a more dark brown, and not ſo much compreſſed as the reſt of the maſs of lava. The eaſtern wall is only forty-five feet four inches in height; and that part of it which is directly oppoſite to the higheſt part on the other ſide, is no more than thirty-ſix feet five inches high.

It is likewiſe conſidered as a ſign of an impending eruption, when ſmall lakes, rivulets, and ſtreams dry up. Some perſons believe, that it does not contribute a little to haſten the eruption, when the mountain is ſo covered with ice, that the holes are ſtopped up through which the exhalations, &c. often found a free paſſage.

Though

Though it is by no means my opinion that this contributes much to it, it cannot be denied, that the fire is generally contained in theſe mountains covered with ice, or, as they are called in the country, *jokuls*.

The firſt thing that is uſually obſerved, before a freſh eruption of fire, is the burſting of the maſs of ice with a dreadful noiſe, whence it is called in Icelandic *Jôkla-hloid* (Jokul's Sound) and *Jokla breſtar*.

The flames then burſt forth, and lightning and balls of fire iſſue with the ſmoak, which are ſeen ſeveral miles. With the flames a number of large and leſs ſtones are ſometimes thrown to an incredible diſtance. I have ſeen a round ſtone near Nafverholt, about a mile from Heckla, that was an ell in diameter, and had been thrown there in the laſt eruption of Heckla. Eggert Olafsen alſo relates, that at the laſt eruption of Kattlegiaa, a ſtone which weighed 290 pounds was thrown to the diſtance of four miles.

A quantity of white pumice-ſtone is alſo thrown up with the boiling waters;

ters; and it is belived, with great probability, that the latter proceeds from the ſea, as a quantity of ſalt ſufficient to load ſeveral horſes has frequently been found after the mountain has diſcontinued burning.

Then follows generally brown or black pumice-ſtone, and lava, with ſand and aſhes.

The lava is ſeldom found near the opening, but rather *tuff*, or looſe aſhes and grit; and indeed the greater part of the Icelandic mountains conſiſts of this matter, which, when it is grown cold, generally takes an arched form, ſome admirable proof of this may be ſeen in the cleft at Allmnnegiaa: the upper cruſt frequently grows cold and ſolid, whilſt the melted matter beneath it continues liquid; this forms great cavities, whoſe walls, bed, and roof are of lava, and where great quantities of ſtalactites of lava are found.

There are a great number of theſe caves in Iceland, ſome of which are very large, and are made uſe of by the inhabitants for ſheltering their cattle.

I will

I will here only take notice of the cave of Surthellir, as the largeſt of all: it is between 34 and 36 feet in height; its breadth is from 50 to 54 feet, and it is 5034 feet long.

It would be both tedious and difficult to claſs the different compoſitions of fire in theſe places, as it is not eaſily diſcovered to which they belong: for example, jaſper, of which great quantities of red and black are found incloſed in the lava, and mixed with it; I will therefore only name thoſe that have been evidently produced by the fire. Firſt, *tuff*, a ſtone of ferruminated aſhes and grit, which ſometimes is found mixed with lava, baſalt, and other ſorts of ſtones, and having been moiſtened by the ſpouting of water, grows hard by heat and length of time. Secondly, *lava*, is that kind of ſtone that has been melted by the violence of the fire, and varies according to the difference of the ſtate in which it ſerved as food to the fire. This lava is ſometimes found ſolid, and at other times porous and full of bladders and holes;

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in the inſide it is filled up with opaque and brittle ſquare cryſtals of a dead white, or with green drops of glaſs, that decay after they have been long expoſed to the air. The colour of the lava is black, dark blue, purple, reddiſh brown, or yellowiſh, but oſteneſt black or red. Where the fire has operated very ſtrongly, it is, as it were, glazed, and looks like reſin. In the ſtreams or great tracts of lava it is ſometimes obſerved, that the cruſt in growing cold has ſet itſelf into folds; but generally it forms a reſemblance of a rope or cable, ſometimes lengthways, and at other times in the form of a circle, like unto a great coiled cable, and generally in ſuch a manner that its thickneſs continually augments from the centre to the periphery. To this claſs I muſt alſo place a black ſolid matter, that ſtrikes fire with ſteel, and ſometimes takes the forms of trees or branches; and ſome people have been inclined to think they are petrified trees, but I am rather of opinion that it is a real

jaſper.

jaſper. Thirdly, pumice, black, red, and even white, which laſt has moſt probably been diſcoloured by the boiling water. Fourthly, agate; I preſerve the received name, though it is really nothing more than burned glaſs. In ſome few places it is found white, tranſparent, and almoſt in the form of cryſtal. The bluiſh ſort is alſo rare, but is found in large pieces: the moſt common is the black agate, that is found generally in ſtrata, or in ſmall nodules, and ſometimes almoſt in the ſhape of cryſtal, in oval, ſquare, or pentagonal forms. The aſtronomer, Mr. Ejnar Jonſſen, has made uſe of this black glaſs in his tubes, both in Copenhagen and Iceland, for his obſervation of the ſun, and has found them greatly preferable to the darkened glaſs. The green agate is found rather coarſe and more reddiſh, like thick bottle glaſs: it is called *hraftinnubroder*.

Brimſtone, which may be conſidered as the proper fuel of the fire, is found in great abundance, pure and mineralized:

ralized: in the north, principally at Huſewick, and in the ſouth at Kruſewick, there are brimſtone mines that they call *Namas*. I ſhall reſerve the baſalts for a particular letter.

LETTER

LETTER XX.

To Professor BERGMAN.

Of Mount Heckla.

Stockholm, Sept. 7, 1773.

THE cause of Heckla (or, as it is called in the country, *Hecklufiall*) having been more noticed than many other volcanos of as great extent, and no less wonderful and instructive, may partly be ascribed to its having vomited fire so frequently, and partly to its situation, which exposes it to the sight of all the ships sailing to Greenland and North America: as we considered it with greater attention than any other volcano on the island, I will give you a description of the state in which we found it on the 24th of September 1772.

After we had seen many tracts of lava, among which Garde and Hvaleyre Hraun were the most consider-

able, we purſued our journey to the foot of the mountain. We had a tent pitched here, where we propoſed to paſs the night, to enable us to aſcend the mountain with greater ſpirits in the morning. The weather was extremely favourable, and we had the ſatisfaction of ſeeing whatever we wiſhed, the eruption only excepted.

The mountain is ſituated in the ſouthern part of the iſland, about four miles from the ſea-coaſt, and is divided into three points at the top, the higheſt of which is that in the middle, and is, according to an exact obſervation with Ramſden's barometer, ſomewhat above 5000 feet higher than the ſea. We made uſe of our horſes, but were obliged to quit them at the firſt opening from which the fire had burſt. This was a place ſurrounded with lofty glazed walls, and filled with high glazed cliffs, which I cannot compare with any thing I ever ſaw before.

A little higher up we found a great quantity of grit and ſtones, and ſtill farther on another opening, which, though not deep, however deſcended

lower down than that of the higheſt point. We thought we plainly obſerved evident marks of hot boiling water in this place.

Not far from thence the mountains began to be covered with ſnow, ſome ſmall ſpots excepted, which were bare. We could not at firſt diſcern the cauſe of this difference, but ſoon found that it proceeded from the vapours ariſing from the mountain. As we aſcended higher, theſe ſpots became larger; and about two hundred yards from the ſummit we found a hole of about one yard and a half in diameter, from which ſo hot a ſteam exhaled, that it prevented us from aſcertaining the degree of heat with the thermometer.

The cold now began to be very intenſe, as Fahrenheit's thermometer, that was at 54 at the foot of the mountain, fell to 24. The wind was alſo become ſo violent, that we were ſometimes obliged to lie down to avoid being thrown into the moſt dreadful precipices by its fury.

We were now arrived at one of the higheſt ſummits, when our conductor, who did not take great pleaſure in the walk, endeavoured to perſuade us that this was the higheſt part of the mountains. We had juſt finiſhed our obſervations, and found by them that Ramſden's barometer ſtood at 24-238, and the thermometer, fixed to it, at 27, when happily the clouds divided, and we diſcovered a ſtill higher ſummit. We loſt no time in deliberation, but immediately aſcended it, and when at the top diſcovered a ſpace of ground, about eight yards in breadth, and twenty in length, entirely free from ſnow; the ſand was, however, quite wet, from the ſnow having lately melted away. Here we experienced at one and the ſame time a high degree of heat and cold, for in the air Fahrenheit's thermometer was conſtantly at 24, and when we ſet it down on the ground, it roſe to 153. The barometer was here at 22-247, and the thermometer at 38.

We could not with ſafety remain here any longer, though we were very

much inclined to it; and deſcended, after having conſidered the laſt opening there, one of the ſides of which was entirely overturned, and the other quite covered with aſhes and grit. In our return we obſerved three conſiderable openings, in one of which every thing looked as red as brick. From another the lava had flowed in a ſtream of about fifty yards in breadth, which the Icelanders call *Stenaa*, or Stone-Flood; and at ſome diſtance from thence the ſtream divided into three broad arms. Further on we found a large circular opening, at the bottom whereof we obſerved a mountain in the form of a ſugar-loaf, in throwing up of which the fire ſeemed to have exhauſted itſelf.

The laſt eruption of mount Heckla happened in 1766; it began the 5th of April, and continued to the 7th of September following. Flames proceeded from it alſo in December 1771, and in September 1772, but no eruptions of lava, &c.

The mountain does not conſiſt of lava, but chiefly of ſand, grit, and

aſhes, which are thrown up with the ſtones, partly melted, and partly diſcoloured by the fire. We likewiſe found ſeveral ſorts of pumice, and among them one piece with ſome ſulphur in it. The pumice was ſometimes ſo much burnt, that it was as light as tow; the form and colour of it was ſometimes very fine, but at the ſame time ſo ſoft, that it was difficult to remove it from one place to another: of the common lava we found both large pieces and ſmall bits, as likewiſe a quantity of black jaſper, burned at the extremities, and reſembling trees and branches. Among the ſtones thrown out of the mountain we ſaw ſome ſlate of a ſtrong red colour.

LETTER

LETTER XXI.

To Profeſſor BERGMAN.

Of the hot ſpouting Water-ſprings in Iceland.

Stockholm, Oct. 3, 1774.

AMONG all the curioſities in Iceland, that nature preſents to the eyes of an attentive ſpectator to raiſe his admiration, nothing can be compared to the hot ſpouting water-ſprings with which this country abounds. The hot ſprings at Aix-la-Chapelle, Carlſbad, Bath, and Switzerland, and ſeveral others found in Italy, are conſidered as very remarkable; but to my knowledge, except in the laſt-mentioned country, the water no where becomes ſo hot as to boil; nor is it any where known to be thrown ſo high as at the hot ſpouting water-ſprings in Iceland.

All thoſe water-works that have been contrived with ſo much art, and at ſo enormous an expence, cannot by any means be compared with theſe. Thoſe at Herrenhauſen throw up a ſingle column of water, of half a quarter of a yard in circumference, to the height of about ſeventy feet; thoſe on the Winterkaſten, at Caſſel, throw it up, but in a much thinner column, 130 feet; and that at St. Cloud, which is thought the greateſt amongſt all the French water-works, caſts up a thin column eighty feet into the air: whilſt ſome ſprings in Iceland ſpout columns of water, of ſeveral feet in thickneſs, to the height of many fathoms; and many affirm, of ſeveral hundred feet.

But, without relying upon what has been ſaid by others of theſe wonderful phænomena of nature, I think myſelf happy to have contemplated with my own eyes the moſt remarkable of theſe ſprings, which has enabled me to give you an accurate account of it. I only beg leave to ſay ſomething of them in general, before I treat of that I particularly ſaw.

Theſe ſprings are of unequal degrees of heat. From ſome the water flows gently as from other ſprings, and it is then called *laug*, a bath; from others, it ſpouts boiling water with a great noiſe, and is then called *hver* or *kittel* (*kettle*). Though the degree of heat is unequal, yet I do not remember ever to have obſerved it under 188 of Fahrenheit's thermometer. At Laugarnas we found it at 188, 191, 193. At Geyſer, Reykum, and Laugarvatn 212; and in the laſt place, in the ground, at a little hot current of water, 213 degrees.

It is very common for ſome of the ſpouting ſprings to ceaſe, and others to ſpring up in their ſtead; there are likewiſe frequent traces of former *hvers*, where at preſent not a ſingle drop of water is to be ſeen. Many remember to have ſeen inſtances of this; and Eggert Olafsen relates, that in 1753 a new *hver* broke forth at Reikakiv, ſeven fathoms in breadth, and three in depth, at the diſtance of fifty fathoms from an old ſpring which had

been ſtopped up by a fall of earth. Frequent earthquakes and ſubterranean noiſes, heard at the time, cauſed great terror to the people who lived in the neighbourhood.

All theſe hot waters have an incruſting quality, ſo that we very commonly find the exterior ſurface from whence it burſts forth covered with a kind of cruſt that reſembles chaced work, we at firſt took it for lime; but ſoon became dubious of this, as it did not ferment with acid; but we hope that you, Sir, will ſoon reſolve us. This cruſt is in general very fine; but is, however, moſt pure and clear at the ſpouting ſprings; for at the others, where the water flows, the parts precipitated by the water are ſometimes mixed with earth, which makes the cruſt appear more dark.

At the *bvcrs* it was very difficult, nay almoſt impoſſible, to examine within the opening the diſpoſition of the paſſage that the water has formed, both by reaſon of the heat of the water,

and

and the violence with which it is forced out. One may, however, with confidence judge of the great by the ſmall; and it gave us the more pleaſure, as we had an opportunity at Laugarnas to examine the very current of water a conſiderable way under the cruſt.

The water had in this place made its courſe through a bright grey clay, the ſurface of which was covered with a white cruſt; but was on the ſide neareſt the clay quite ſmooth, and criſped on the upper ſide. The current flowed a good way under this cruſt, through a canal formed of a ſimilar matter; and the whole canal was filled with cryſtals, that had a very pleaſing effect. I had not time to examine their nature and form on the ſpot, as they were very ſmall; but I expect a more particular account of this ſubject from you, as you will find ſeveral ſpecimens of them in the collection I ſent you. We could not, however, purſue the courſe of the water very far, as we were obliged to leave it to its ſubterranean paſſages, through which nature had carried

ried it from its reſervoirs, where, heated by the warmth, and compreſſed by the exhalations, it at laſt burſts from its confinement by guſhing forth at another place, in order make way for its vapours.

The water in ſome places taſtes of ſulphur, and in others not; but when drank as ſoon as it is cold, taſtes like common boiled water. The inhabitants uſe ſome *hvers* at particular times for dying; and were they to adopt proper regulations, it might be ſtill of more uſe. Victuals may alſo be boiled in it, by putting it into a covered pot, and boiling it till a certain quantity is evaporated. Milk held over this water when boiling becomes ſweet, owing, moſt probably, to its exceſſive heat; as the ſame effect is produced by boiling it a long time over the fire. They have begun to make ſalt, by boiling ſea-water over it, which, when it is refined, is very fine and good. The cows that drink of it yield a great quantity of good milk. Eggert Olafſen informs us, that the water does not become troubled when an alkali is thrown

thrown into it, nor does it change colour from ſyrup of violets. I do not know what degree of credit ought to be given to Horrebow, who aſſerts, that if you fill a bottle at one of the ſpouting ſprings, the water contained in the bottle will boil over two or three times during the time the ſpring throws it forth, and if corked too ſoon the bottle will burſt.

Though it cannot be denied that theſe ſprings have ſome communication with the Icelandic volcanos, yet they are ſeldom found very near them, but are diſperſed throughout the whole country. For this reaſon, hot ſprings are found not only among the mountains, but alſo on the top of the ice mountains; as on Torfa Jockul, where a great number of hot ſprings are to be met with; and among them two large *hvers*, that throw up the boiling water to a great height. There is likewiſe a lukewarm ſpring near Haadegis Hnuk, on Geitland's Jokul, at the foot of the mountain, with many traces of former *hvers*. There are even in the ſea hot ſpouting ſprings, that can only be approached

proached at low water; as at Reykafiord in Iſa-fiord, where four ſprings may be obſerved in the water by the aſcending ſteam, and one *hver* on the ſurface of the water. There are alſo two others in the Oddbiarnar ſhoals, ſtill more at Drapſkar, and a great number by Sando, Urdholm, Reykey, and on the flat iſlands. To give a better idea of the ſituation of theſe ſprings, I will give a liſt of them, that I will endeavour to make as topographical as poſſible.

In Borgarfiord's Syſſel, near Leyraa, not far from the foot of the mountain of Skardſheide, we met with the firſt *hver*, which is, however, not a very ſtrong one; and not far from it there is a ſmall bath. At Lunda Reykiadal there is a *hver* and a bath; and near a farm-yard, Varma-Lakiar-Mula, a warm ſpring and a bath. A little farther to the north is the valley of Reykholts, that is two miles and a half in breadth, in the bottom of which hot baths are every where to be met with. This ſpot may be diſcovered at ſeveral miles diſtance by the vapours

that

that exhale every where from the hot water, and unite in the air, reſembling a prodigious ſmoke ariſing from ſome volcano. The three principal *hvers* in this place are, Tunguhver, Aaa-hver, and Scribla; the laſt furniſhes water to Snorralaug (Snorre Sturleſon's bath) that is eſteemed the beſt in Iceland. From this place there is no hot ſpring to be met with northward for a very large tract, till you come to Sneefield's Cape, where there is a lukewarm ſpring near the farm called Lyſehol, in Stadeſveit: and at this place many remains of antient *hvers* are to be ſeen. Still further to the north, in Dale Syſſel, is a warm bath with ſome ſprings. In Soling's Valley, and further on, near the farm Reykaholer, in Reykianas, are many ſtrong *hvers*; particularly three very large ones, but the moſt conſiderable of them is Krablanda. From thence we came to the hot ſprings of Flatdarna, Oddsbiarmarſkar, and Drapſkar; and afterwards viſited thoſe at Talkne-fiord, Arnar-fiord, and Iſa-fiord in Reyka-fiord, where there is a ſtrong ſpouting ſpring.

After

After we had paſt Cape Nord, or the northern extremity of Iceland, we met with ſome warm ſprings at Reykar-fiord; others, together with a fine bath, at Biarnar-fiordr near Kaldadarna: at Hruta-fiorden there is a great *hver* calle Reike-hver, and another as large at Midfiorden, called Reikalaug. When you go from hence ſouthward into the country, you will find a number of boiling ſprings at Hverevalle, three of which ſpout the water high into the air with a prodigious noiſe; ſtill further to the ſouth there is a *hver* near Geitland's Jokul.

If we turn again to the north, we find hot ſprings at Blanda, others near the haven at Skaga-Strand, and ſtill more at a little diſtance from thence at Skaga-fiorden; one of which falls from a rock thirty feet high. To the eaſt there are hot ſprings in many places of Vadle Syſſel, as at Olafs-fiordr, Langaland, Kriſtnas, and Hrafnegil; but in Thingo Syſſel there are ſprings of both ſorts (baths and *hvers*) in great number, and of conſiderable dimenſions. The *hvers* in

Reykia

Reykia Valley deſerve to be particularly mentioned, amongſt them Oxe and Badſtofu are the largeſt.

On the eaſt ſide of the country there are no conſiderable *hvers*, though warm ſprings are to be found in Selar, Laugarvalle, Rafukells, and Fliots valleys; and on the ſouth, on Torfa Jokul. We then proceeded to Skallholt, where there are many ſprings; about a mile from thence the *hvers*, called Reikholt and Grafa, which both ſpout very high. The next *hver* is Geyſer, which I ſhall afterwards mention more minutely. Not far from this laſt is Laugervatn, a ſmall lake, round which a number of warm ſprings may be obſerved, and eight boiling ones. The road now leads us to the *hvers* at Oelves, that are thought to be the largeſt in all Iceland; the moſt remarkable of which are Geyſer and Badſtofu.

Here is alſo a dry *hver*, water formerly proceeded from it, but now it emits only ſteam at the mouth; the heat of which however is ſo great, that

a pot

a pot of water placed over the opening boils in a very ſhort time. We met with ſpouting ſprings at Kruſevik in Gullbringe Syſſel, the *hver* Eine, the *hvers* at Reikianas, and ſeveral at Laugarnas in Kiofar Syſſel.

From this liſt, that, however, is far from containing all the warm ſprings in Iceland, you may judge, Sir, of the prodigious number that we met with. Near moſt of them are warm baths, each whereof merit a particular examination and deſcription. Eggert Olafsen and Biarne Paulſen have made very curious obſervations on ſeveral of them; but I only beg leave to mention ſome which I made at Geyſer, where is the largeſt of all the ſpouting ſprings in Iceland, or perhaps in the known world. Theſe obſervations were made the 21ſt of September 1772, from ſix o'clock in the morning till ſeven at night.

Among the hot ſprings in Iceland, ſeveral of which bear the name of *geyſer*, there are none that can be compared with that I am going

to

to deſcribe, though the beſt deſcription will fall very ſhort of it. It is about two days journey from Heckla, not far from Skallholt, near a farm called Haukadal. Here a poet would have an opportunity of painting a picture of whatever Nature has of beautiful and terrible united, by delineating one of its moſt uncommon phænomena: it would be a ſubject worthy the pen of a Thompſon to tranſport the reader, by poetical imagery, to the ſpot that is here preſented to the eye. Figure to yourſelf a large field, where you ſee on one ſide, at a great diſtance, high mountains covered with ice, whoſe ſummits are generally wrapped in clouds, ſo that their ſharp unequal points became inviſible. This loſs, however, is compenſated by a certain wind, that cauſes the clouds to ſink, and cover the mountain itſelf, when its ſummit appears as it were to reſt upon the clouds. On the other ſide, Heckla is ſeen, with its three points covered with ice, riſing above the clouds, and, with the ſmoke which aſcends from it, forming other clouds at

ſome diſtance from the real ones; and on the other ſide is a ridge of high rocks, at the foot whereof boiling water from time to time guſhes forth; and further on a marſh extends of about half a mile in circumference, where are forty or fifty boiling ſprings, from which a vapour aſcends to a prodigious height.

In the midſt of theſe is the greateſt ſpring *geyſer*, that deſerves a more exact and particular account. In travelling to the place, about a quarter of a mile from the *hver*, from where the ridge of rocks near it ſtill divided us, we heard a loud roaring noiſe, like the ruſhing of a torrent, precipitating itſelf from ſtupendous rocks. We aſked our guide what it meant: he anſwered, it was *geyſer* roaring; and we ſoon ſaw with our eyes what before appeared almoſt incredible.

The depth of the opening or pipe, from which the water guſhes, cannot well be determined; for ſometimes the water ſunk down ſeveral fathoms, and ſome ſeconds paſſed before a ſtone that was thrown into the aperture reached

reached the ſurface of the water. The opening itſelf was perfectly round, and nineteen feet in diameter; it ended above in a baſon that was fifty-nine feet in diameter; both the pipe and the baſon were covered with a rough ſtalactitic cruſt, that had been formed by the force of the water; the uttermoſt border of the baſon is nine feet and an inch higher than the pipe itſelf.

The water here ſpouted ſeveral times a day, but always by ſtarts, and after certain intervals. The people who lived in the neighbourhood told us, that they roſe more high in cold and bad weather than at other times; and Eggert Olafsen and ſeveral others affirm, that it ſpouted to the height of ſixty fathoms. Moſt probably they only gueſſed by the eye, and on that account their calculation may be a little exaggerated; and indeed I doubt that ever the water was thrown up ſo high, though I am much inclined to believe, that it ſometimes mounts more high than when we obſerved it.

I will here inſert an account, how high the water was thrown the day that we were there, which I hope will not be diſagreeable to you. We obſerved the height thus; every one in company wrote down at each time that the water ſpouted, how high it appeared to him to be thrown, and we afterwards choſe the medium. The firſt column marks the ſpoutings of the water, in the order they followed each other; the ſecond, the time when theſe ſpoutings happened; the third, the height to which the water roſe; and the laſt, how long each ſpouting of water continued.

Nº	Time.	Height.	Duration.
1	At VI 42m.	30 feet	0 m. 20ſ.
2	- 51 -	6 -	0 20
3	VII 6 -	6 -	0 10
4	- 31 -	12 -	0 15
5	- 51 -	60 -	0 6
6	VIII 17 -	24 -	0 30
7	- 29 -	18 -	0 40
8	- 36 -	12 -	0 40

The

The pipe was now for the firſt time full of water, and ran ſlowly into the baſon.

N°	Time.	Height.	Duration.
9	IX 25	- 48 -	1 10
10	X 16	- 24 -	1 0
	XII 35	minutes we heard as it were three diſcharges of a gun under ground, that made it ſhake, the water immediately flowed over, but ſunk again inſtantly.	
	II 8	the water flowed over the border of the baſon.	
	III 15	we again heard ſeveral ſubterraneous noiſes, tho' not ſo ſtrong as before.	
	IV 43	the water flowed over very ſtrongly during a whole minute.	
	49	we again heard many loud ſubterraneous diſcharges, not only near the ſpring, but alſo from the neighbouring ridge of rocks, where the water ſpouted.	
11	VI 51	- 92 -	4 0

After this great effort, the water ſunk down very low into the pipe, and was entirely quiet during ſeveral minutes; but it ſoon began to bubble again: it was however not thrown up into the air, but only to the top of the pipe.

N°	Hours.	Min.	N°	Hours.	Min.
1	5	7	18	5	42
2	5	9 1/2	19	5	43 1/2
3	5	10 1/2	20	5	47
4	5	13 1/2	21	5	48 1/2
5	5	14 3/4	22	5	49
6	5	17	23	5	30 1/2
7	5	18 3/4	24	5	51 1/2
8	5	20 1/8	25	5	54
9	5	21 1/2	26	5	37 1/2
10	5	23 1/2	27	5	59
11	5	27 3/4	28	6	10
12	5	30 1/4	29	6	19
13	5	31 3/4	30	6	23
14	5	33 1/2	31	6	26
15	5	35	32	6	29
16	5	36	33	6	30
17	5	38			

The force of the vapours that throw up this water is exceſſive; it not

not only prevents the ſtones that are thrown into the opening from ſinking, but even throws them up to a very great height, together with the water. I muſt not forget to mention a very curious circumſtance: when the baſon was full of water, we placed ourſelves before the ſun in ſuch a manner, that we could ſee our ſhadows in the water; every one obſerved round the ſhadow of his own head (though not round the heads of the others) a circle of almoſt the ſame colours that compoſe the rainbow, and round this another bright circle: this moſt probably proceeded from the vapours exhaling from the water. I remember to have ſeen ſomething ſimilar to it when travelling in the ſummer, particularly in the meadows, and it is ſooneſt obſerved when riding on horſeback, or in a carriage, when you have your ſhadow on one ſide.

Not far from this place another ſpring, at the foot of the neighbouring ridge of rocks, ſpouted water to the height of one or two yards each time.

Nº	Hours.	Min.	Nº	Hours.	Min.
1	3	45	7	4	0
2	3	47½	8	4	3
3	0	50½	9	0	5¾
4	0	53½	10	0	8½
5	0	55	11	0	11¼
6	0	57¾	12	0	14

The opening through which this water iſſued was not ſo wide as the other; we imagined it poſſible to ſtop up the hole entirely by throwing large ſtones into it; and even flattered ourſelves that our attempt had ſucceeded, but, to our great aſtoniſhment, the water guſhed forth in a very violent manner; this ſhews how little the weak efforts of man avail, when they endeavour to proſcribe bounds to the works of nature. We haſtened to the pipe, and found all the ſtones thrown aſide, and the water playing freely through its former channel.

In theſe large ſprings the waters were hot in the higheſt degree, and taſted a little of ſulphur, but in other reſpects were pure and clear. In the ſmaller ſprings in the neighbourhood

the water was tainted; in ſome it was as muddy as that of a clay-pit, in others as white as milk; and yet there are a few ſprings where the water forces itſelf through a fire underneath as red as blood.

I have already obſerved, that near moſt of theſe ſprings and *hvers* there are baths, and are frequently viſited by the natives: there are alſo in many places dry and ſweating-baths. Eggert Olafsen mentions one of theſe baths at Huuſevik, in North Iceland; and I had the curioſity of ſeeing one of them at Thibſaarholt, not far from Skallholt, it conſiſted of a hut raiſed of earth, into which hot ſteams aroſe from many holes. Fahrenheit's thermometer, which was at 57 degrees in the open air, roſe to 93 in the hut whilſt it was open, and when it was placed in one of the little openings the ſteam aroſe to 125.

LETTER

LETTER XXII.

To Profeſſor BERGMAN.

Of the Pillars of Baſalt.

Stockholm, June 6, 1773.

AMONG the effects of fire, ſome of which are extremely dreadful, and all of them very extraordinary and remarkable, none have in latter times attracted more attention than thoſe large regular pillars known by the name of Baſalts. Formerly there had been hardly any places obſerved in Europe where this kind of ſtone was found, the Giant's Cauſeway excepted; and the moſt part of our mineralogiſts have, if I am not miſtaken, conſidered them as a kind of cryſtallization. Mr. Deſmarets was the firſt who maintained, in a diſſertation he preſented to the French academy of ſciences, that they were produced by fire; and in it he deſcribed ſome baſalts found near St. Sandour in Auvergne.

This

This opinion at firſt appeared almoſt abſurd to our natural hiſtorians, as it was not believed that volcanos had ever been in theſe places where baſalt pillars were found.

This new diſcovery however occaſioned a more exact enquiry concerning other places where theſe pillars are met with. All theſe enquiries only ſerved to confirm Mr. Deſmarets's opinion, by proving that theſe baſalt pillars muſt have been produced by ſubterraneous fires.

There is no one ſurely will entertain the leaſt doubt of a ſubterraneous fire having formerly exiſted where theſe pillars now ſtand, as at Stolpenſtein in Miſnia; near Lauban in Luſatia; in Bohemia; near Leignitz in Sileſia; near Brandau in Heſſe; in Sicily; near Bolſenna, Montebello, and St. Forio in Italy; near St. Lucas in the diſtrict of St. Vicenza; near Monte Roſſo in the Paduan diſtrict, and Monte Diavolo in the mountains of Verona; in Lower Languedoc; in Iceland, and in the weſtern iſlands of Scotland; all which you, Sir, have men-

mentioned in your Coſmography. Alſo in St. Giovanni, Monte Caſtello, Monte Nuovo, Monte Oliveto, near Cader Idris in Wales, in England, almoſt every where in Velay and Auvergne, where whole towns, as Chillac and St. Flour, are built upon theſe pillars. But as this matter has not yet been fully inveſtigated, and it cannot be determined with certainty in what manner theſe pillars are formed, though they are known to be produced by fire, perhaps it will not be diſagreeable to you, if I ſay ſomething of the many baſalt pillars in Iceland, as well as of thoſe in the iſle of Staffa, which you will readily acknowledge to be more ſingular than any thing nature ever produced of this kind.

It is well known that theſe pillars are very common in Iceland, and ſome account is alſo given of them in the Phyſical Deſcription publiſhed of the country. The lower ſort of people imagine theſe pillars have been piled upon one another by the giants, who made uſe of ſupernatural force to effect it,

it, whence they have obtained the name of the *Trolla-hlaud Trollkonu* in ſeveral places. They have generally from three to ſeven ſides, and are from four to ſix feet in thickneſs, and from twelve to ſixteen yards in length, without any horizontal diviſions. But ſometimes they are only from ſix inches to one foot in height, and they are then very regular, as are thoſe at Videy, that are uſed for windows and door-poſts. In ſome places they only peep out of the mountains here and there among the lava, or ſtill oftener among *tuff*; in other places they are quite overthrown, and only pieces of broken pillars appear. Sometimes again they extend two or three miles in length without interruption. In the mountain called Glockenberg in Snefialdſnas, this kind of ſtone appears in a manner very different from any other place in Iceland; for on the top the pillars lie quite horizontal, in the middle they are ſloping, and the loweſt are perfectly perpendicular; in ſome places they are bent as a ſemicircle,

circle, which proves a very violent effect of the fire on the pillars already ſtanding, as in moſt places, or at leaſt in a great many, they are intirely perpendicular, and by their form and ſituation ſhew that they have even been burnt in a perpendicular direction.

As to the matter of which the Icelandic baſalts are compoſed, it is in ſome places ſimilar to that of which the pillars at Staffa conſiſt, though in others it is more porous, and inclines more to grey. And who knows, if an attentive and curious naturaliſt, who had both time and talents requiſite for ſuch an undertaking, might not eaſily trace all the gradations between the coarſeſt lava and the fineſt pillar of baſalt? I myſelf ſaw ſome of this laſt ſort at Videy, that were ſolid, of a blackiſh grey, and compoſed of ſeveral joints. Not far from thence, at Laugarnas, near the ſea-ſhore, I ſaw a porous glaſſy kind of ſtone, conſequently lava, but was ſo indiſtinctly divided, that I was for a long time undetermined, whether I ſhould conſider it as pillars or not; but

but at length the reſt of the company, as well as myſelf, were perſuaded that they really were pillars. But I will poſtpone the examination of the matter of which theſe pillars conſiſt, and of the manner in which they are formed, till ſuch time as I have given you the promiſed deſcription of the iſle of Staffa.

A piece of good fortune procured us the pleaſure of being the firſt who ever examined theſe wonders of nature with an attentive eye. Among all thoſe who have publiſhed deſcriptions of Scotland, there are none except Buchanan, whoſe account, however, is very imperfect, that mentions a ſingle ſyllable of theſe pillars. Mr. Pennant, an indefatigable and experienced naturaliſt, in the ſame year that we viſited this iſland, made a tour to Scotland to examine the natural productions of that country, but was prevented by a contrary wind from going Staffa. Moſt probably we ſhould not have come there neither, if the uſual ebb and flood, which is very ſtrong

ſtrong between the weſtern iſlands of Scotland, had not forced us in our way to Iceland, on the twelfth of Auguſt in the night, to caſt anchor in the Sound, between the iſle of Mull and Morven on the Continent, exactly oppoſite to Drumen, the ſeat of Mr. Maclean. We were immediately invited to land, and breakfaſted there with the hoſpitality that characterizes the inhabitants of the Highlands of Scotland. Mr. Leach, another gueſt of Mr. Maclean, gave us many particulars of theſe pillars, which he had viſited a few days before. Mr. Banks's deſire of information could not reſiſt the offer of this gentleman to accompany us to Staffa; we therefore went on board our long-boat the ſame day, and arrived there at nine o'clock in the evening. It was impoſſible for our ſurprize to be increaſed, or our curioſity to be fuller gratified, than they were the next morning, when we beheld the beautiful ſpectacle that nature preſented to our view.

If we even with admiration behold art, according to the rules preſcribed to it, obſerving a certain kind of order that not only ſtrikes the eye, but alſo pleaſes it; what muſt be the effect produced upon us when we behold nature diſplaying as it were a regularity that far ſurpaſſed every thing art ever produced! An attentive ſpectator will find as much occaſion for wonder and aſtoniſhment, to obſerve how infinitely ſhort human wiſdom appears, when we attempt to imitate nature in this as well as in any other of her grand and awful productions. And though we acknowledge nature to be the miſtreſs of all the arts, and aſcribe a greater degree of perfection to them, the nearer they approach and imitate it, yet we ſometimes imagine that ſhe might be improved, according to the rules of architecture.

How magnificent are the remains we have of the porticoes of the antients! and with what admiration do we behold the colonnades which adorn the principal buildings of our times! and

yet every one who compares them with Fingal's Cave, formed by nature in the iſle of Staffa, muſt readily acknowledge, that this piece of nature's architecture far ſurpaſſes every thing that invention, luxury, and taſte ever produced among the Greeks.

The iſland of * Staffa lies weſt of Mull, and three miles N.E. of Jona or Columb-Kill; it is about a mile in length, and half a mile in breadth, and belongs to Mr. Lauchlan Mac-Quarie. On the weſt ſide of the iſland is a ſmall cave, where there is a very convenient landing-place, but where no regular baſalt figures are to be met with. To the ſouth of this cave are ſome narrow pillars, that, inſtead of ſtanding upright, are all inclined, and look like ſo many pieces of an arch. Further on

* Mr. Banks's account of this iſland, as communicated by that inteiligent gentleman to Mr. Pennant, and inſerted in his Tour in Scotland, and Voyage to the Hebrides in 1772, is too curious to be omitted, as it is not only very intereſting in itſelf, but is an undeniable proof of the accuracy and fidelity with which our author, Dr. Troil, has treated of the various ſubjects contained in this publication:— the editor deems it therefore unneceſſary to apologize for ſubjoining an extract of it to this letter.

you leave a ſmall grotto on your right hand, which is not compoſed of pillars, though they appear more diſtinctly and larger above it, and in one place reſemble the interior timber-work of a ſhip. Directly oppoſite to it, only a few yards diſtant, is the peninſula of Boſcha-la, that entirely conſiſts of regular though leſs pillars, and all of a conical figure. Some of them lie horizontally, others incline, as it were, to the central point, as to the upper end; but the greater number are perfectly perpendicular. The iſland itſelf, oppoſite to Boſcha-la, conſiſts of thick columns or pillars, not however very high, as they gradually decreaſe in approaching to the water, and extend into the ſea as far as the eye can reach. You may walk upon theſe with great eaſe, as from one ſtep of a ſtaircaſe to another, till you come to Fingal's, or more properly ſpeaking, to Fiuhn Mac Coul's grotto or cave, which enters into the mountain from N. E. to E.

This cave conſiſts of very regular pillars, which to a great extent on

both ſides, and in the moſt interior part, ſupport an arched vault, compoſed of the obtuſe points of pillars crouded cloſe together. The bottom of the cave, which is filled with clear freſh water ſeveral feet in depth, is likewiſe covered with innumerable pieces of pillars, that compoſe its floor. The colour of the pillars is of a blackiſh grey ; but between the joints there is a yellow ſtalactitic cruſt that makes theſe diviſions more diſtinct, and produces an agreeable effect to the eye, by the many different contraſts of colour. It is ſo light within the cave, that one can diſtinguiſh the innermoſt range of pillars perfectly well from without. The air in it is very pure and good, as it is conſtantly changed by the riſing and falling of the water during the tide. Very far into the cave there is a hole in the rock, ſomewhat lower than the ſurface of the water ſtanding in it, that makes a pleaſing kind of noiſe on every flux and reflux of the tides. One may walk in moſt parts of the

cave

cave on the broken points of ſome pillars riſing above the ſurface of the water, but it is moſt convenient to go in a boat. We made the following meaſurements of the cave:

	F.	I.	F.	I.
The length, from the fartheſt of the baſalt pillars, that form a canal from the ſhore to the cave, - -	121	6	371	6
From the commencement of the vault to the end of the cave,	250	0		
The breadth of its entrance,			53	7
Of the interior end,			20	0
The height of the vault at the entrance of the cave,			117	6
Of ditto, at the interior end,			70	0
The height of the outermoſt pillar in one corner, -			39	6
The height of another, in the north-weſt corner, -			54	0
The depth of the water at the entrance, - -			18	0
At the inner end, -			9	0

Above the cave was a ſtratum of a ſtone mixed with pieces of baſalt. We made the following meaſurements :

	F.	I.
From the water to the foot of the pillars, -	36	8
Height of the pillars, -	39	6
Height of the arch or vault above the top of the pillars,	31	4
The ſtratum above this,	34	4

From hence, a little farther north-weſt, we met with the largeſt pillars that are to be found in the whole iſland. The place on which they ſtood was likewiſe quite free, ſo that we were enabled to examine it. The following was the reſult of our meaſurement :

The weſtern corner of Fingal's Cave:

1. From the water to the foot of the pillars, -	12	10
2. Height of the pillars,	37	3
3. The ſtratum above them,	66	9

Farther weſtward :

1. The ſtratum beneath the pillars, - -	11	0
2. Height of the pillars -	54	0
3. The ſtratum above, -	61	6

Still more weſtward: F. I.

1. Stratum beneath the pillars, - - - - 17 1
2. Height of the pillars, 50 0
3. The ſtratum above them, 51 1

Still more to the weſt:

1. Stratum beneath the pillars, - - - - 19 8
2. Height of the pillars, 55 1
3. The ſtratum above, 54 7

The ſtratum beneath the pillars here mentioned is evidently *tuff*, which had been heated by fire, and ſeems to be interlarded, as it were, with ſmall bits of baſalt; and the bed or ſtratum above the pillars, in which large pieces of pillars are ſometimes found irregularly thrown together, and in unequal directions, is evidently nothing elſe but lava. Though a prodigious degree of fire muſt formerly have been requiſite to produce this upper ſtratum, yet there are not the leaſt traces in its exterior, the pillars having been removed by it, for the whole enormous maſs reſts upon them.

When you move farther on, and paſs the northern ſide of the iſland,

you come to Corvorant's Cave, where the bed beneath the pillars is raiſed, and the pillars themſelves decreaſe in height: they are, however, tolerably diſtinct, till you are paſt a bay that extends very far into the country, and on the ſide of it the pillars entirely diſappear. The mountains here conſiſt of a dark brown ſtone, of which I cannot affirm with certainty whether it is lava or not, and where not the leaſt regularity is to be obſerved; but as ſoon as you paſs the ſouth-eaſt ſide of the iſland, the ſtones begin again to aſſume a regular figure, though ſo gradually, that it is ſcarcely perceptible at firſt, till at laſt, the regular and crooked pillars again appear with which I began my deſcription.

The pillars have from three to ſeven ſides, but the greater number have five or ſix, and ſo crouded together, that a heptagonal pillar is ſurrounded with ſeven others, that join cloſely to its ſeven ſides. In ſome places, however, there are little inſignificant fiſſures, but they are filled up with *quarz*; but

but in one place they had even made way through a number of pillars, though without in the leaſt deſtroying their regularity. The pillars conſiſt of many joints or pieces, of about a foot in height, which ſo exactly fit upon one another, that it is difficult to introduce a knife between the interſtices. The upper piece was generally concave, ſometimes flat, and rarely convex; if the upper joint was flat, the loweſt was ſo likewiſe; but when it was excavated, the lower one was rounded and reverſed.

The ſides of the pillars are not all equally broad. The following meaſurements were taken of four pillars:

		Feet.	Inches.
N° I.	with 4 ſides, Diameter	1	5
	1ſt ſide - -	1	5
	2d - - -	1	1
	3d - - -	1	6
	4th - -	1	1
N° II.	with 5 ſides, Diameter	2	10
	1ſt ſide - -	1	10
	2d - - -	1	10
	3d - - -	1	5
	4th - - -	1	7½
	5th - - -	1	8

N° III.

	F.	I.
N° III. with 6 ſides, Diameter	3	6
1ſt ſide - -	0	10
2d - -	2	2
3d - -	2	2
4th - -	1	11
5th - -	2	2
6th - -	2	9
N° IV. with 7 ſides, Diameter	4	5
1ſt ſide - -	2	10
2d - -	1	4
3d - -	1	10
4th - -	2	0
5th - -	1	1
6th - -	1	6
7th - -	1	3

The pillars are intirely ſmooth, and as ſharp cornered as thoſe of the Giant's Cauſeway; their colours are generally black, though the external ſides ſometimes incline to yellow, as their ſurfaces are bleached by the weather. As to their grain and ſubſtance, they intirely reſemble, and are moſt probably the ſame original ſubſtance as the moſt fine trapp of Weſt-Gothland. As I have none remaining of it, I cannot examine

examine what effect borax and other alloys, or aqua-fortis, and the like, would have upon it: what is the nature of its ſpecific gravity, and what poliſh it will admit, it would, notwithſtanding, be uſeful to be informed of all this in order to compare it with ſimilar kinds of ſtone from other parts.

But in what manner have theſe regular pillars been produced? It is the received opinion that the fire has been acceſſary to it: you have yourſelf remarked, Sir, that it muſt either have been a matter melted by fire, and afterwards burſt, and then a liquid, which we are yet unacquainted with, that muſt have produced theſe regular cryſtallizations; or elſe that it muſt have been, as you have likewiſe obſerved, a kind of earth, which, after having been ſoftened by the exhalations ariſing from a ſubterraneous fire, its whole maſs was forced out of its ſituation, and aſſumed this regular form as it grew dry. I have noticed this diſtinct and regular appearance in dried clay, and even in ſtarch when dried in a cup or baſon.

For

For it may be demonſtrated that they are not cryſtals formed by nature, by their not being produced as all other cryſtals are, by external appoſition (per appoſitionem) nor in any other matrix, as is common to cryſtals.

It would be very difficult to determine whether the matter of which theſe priſmatic pillars conſiſt, burſt into theſe regular forms after it was melted, and was growing cold, or whilſt it was drying, as you ſeem inclined to believe: I cannot deny that my eyes have prepoſſeſſed me in favour of the firſt opinion, in all thoſe places where I have ſeen any of theſe pillars; but as ſo many objections may be offered againſt this opinion, I am obliged to leave the matter undetermined. The following may, however, ſerve as a proof, that I did not, without due foundation, believe them to be a kind of lava, that burſt in growing cold and hard. Firſt, you find both in the iſland of Staffa and many other places, that the pillars ſtand on *lava* or *tuff*, and are ſurrounded by this matter.

Secondly,

Secondly, at Staffa, there was a large ſtratum above the pillars, and in ti were many pieces of theſe pillars irregularly thrown among one another, which leaves us to conjecture that they muſt have been more in number, and higher after an old eruption of fire, but that a ſubſequent eruption had overthrown them, and mixed them with the whole maſs. Thirdly, we found one of theſe pillars, on breaking it, full of drops, almoſt like a ſtalactite or dripping ſtone; and none ſurely will pretend a baſalt to be of ſuch a compoſition. Fourthly, I have formerly ſaid, that the pillars in ſome places reſemble the inſide timber-work of a ſhip; that is to ſay, theſe pillars, which moſt probably were quite ſtrait at firſt, in falling received this crooked inclination; nor were they only the joints of the outermoſt or loweſt ſide which warped a little, but each ſtone was bent ſingly. Fifthly, we found on the ſhore at Huitara, near Skallholt, a fragmentof baſalt, with a piece of glaſs ſticking in it, in the ſame manner as cryſtals, like garnets, are found in the baſalts

baſalts at Bolſenna, which are like thoſe that abound in the lava of Iceland and Italy. And laſtly, a kind of ſtone near Laugarnas in Iceland, which was much coarſer, and more glaſſy than the common baſalts, and evidently was lava burſt into polyedrous and regular figures, though not quite ſo regular as the above-mentioned pillars.

What I have here ſaid, might eaſily induce one to imagine that the baſalt, after having been melted, and become cold again, had been burſt into ſuch pillars. But two objections, that yon raiſe againſt this opinion, are difficult to be removed. Firſt, this matter melts ſo eaſily, that it becomes glaſs without difficulty, before the blow-pipe for aſſaying, whence it ſeems that this maſs muſt neceſſarily have been changed to glaſs, if it had been expoſed to ſo great a fire as that of an eruption. But may one ſafely judge of an experiment made in miniature by the blow-pipe of the workings of nature at large? Might not, perhaps, an addition we are unacquainted with, have prevented the maſs

maſs from becoming glaſs, and cauſe it to break into theſe regular figures, though we cannot now determine wherein this addition conſiſted? Secondly, we find that the trapp in Weſt-Gothland, which both in appearance and ſubſtance ſo much reſemble baſalts, though it does not form itſelf into pillars, ſtands on ſlate; and how could this trapp have been formed by the fire, without, at the ſame time, acting on the bed, which is of ſo combuſtible a nature? But ſhould not, perhaps, the fire be able to form the trapp into pillars? Perhaps all baſalt pillars may have been a maſs of trapp in the bowels of the earth, that being liquefied during an eruption, was thrown up, and ſplit into pillars. But, Sir, I fear to fatigue you with my conjectures and queſtions; it would, however, be very agreeable to me and other naturaliſts, if you would kindly communicate to us your thoughts on this ſubject. This would, no doubt, enable us to judge with more certainty of the baſalts, that at preſent

preſent engages the attention of the curious in general, and all naturaliſts in particular.

ACCOUNT of the Iſland of STAFFA,

COMMUNICATED

BY JOSEPH BANKS, ESQ.

IN the Sound of Mull we came to anchor (Auguſt 12, 1772) on the Morven ſide, oppoſite to a gentleman's houſe called Drumnen: the owner of it, Mr. Macleane, having found out who we were, very cordially aſked us aſhore: we accepted his invitation, and arrived at his houſe; where we met an Engliſh gentleman, Mr. Leach, who no ſooner ſaw us, than he told us, that about nine leagues from us was an iſland, where he believed no one even in the highlands had been, on which were pillars like thoſe of the Giant's Cauſeway: this was a great object to me who had wiſhed to have ſeen the cauſeway itſelf, would time have allowed: I therefore reſolved to proceed directly, eſpecially as it was juſt in the way to the Columb-kill; accordingly having put up two days proviſions, and my little tent, we put off in the boat about one o'clock for our intended voyage, having ordered the ſhip to wait for us in Tobir-more, a very fine harbour on the Mull ſide.

At nine o'clock, after a tedious paſſage, having not had a breath of wind, we arrived, under the direction of Mr. Macleane's ſon and Mr. Leach. It was too dark to ſee any thing. ſo we carried our tent and baggage near the only houſe upon the iſland, and began to cook our ſuppers, in order to be prepared for the earlieſt dawn, to enjoy that which from the converſation

tion of the gentlemen we had now raiſed the higheſt expectations of.

The impatience which every body felt to ſee the wonders we had heard ſo largely deſcribed, prevented our morning's reſt; every one was up and in motion before the break of day, and with the firſt light arrived at the S. W. part of the iſland, the ſeat of the moſt remarkable pillars; where we no ſooner arrived, than we were ſtruck with a ſcene of magnificence which exceeded our expectations, though formed, as we thought, upon the moſt ſanguine foundations: the whole of that end of the iſland ſupported by ranges of natural pillars, moſtly above fifty feet high, ſtanding in natural colonades, according as the bays or points of land formed themſelves: upon a firm baſis of ſolid unformed rock, above theſe, the ſtratum, which reaches to the ſoil or ſurface of the iſland, varied in thickneſs, as the iſland itſelf formed into hills or vallies; each hill, which hung over the columns below, forming an ample pediment; ſome of theſe above ſixty feet in thickneſs, from the baſe to the point, formed by the ſloping of the hill on each ſide, almoſt into the ſhape of thoſe uſed in architecture.

We proceeded along the ſhore, treading upon another Giant's Cauſeway, every ſtone being regularly formed into a certain number of ſides and angles, till in a ſhort time we arrived at the mouth of a cave, the moſt magnificent, I ſuppoſe, that has ever been deſcribed by travellers.

The mind can hardly form an idea more magnificent than ſuch a ſpace, ſupported on each ſide by ranges of columns; and roofed by the bottoms of thoſe, which have been broken off in order to form it; between the angles of which a yellow ſtalagmitic matter has exuded, which ſerves to define the angles preciſely, and at the ſame time vary the colour with a great deal of elegance; and to render it ſtill more agreeable, the whole is lighted from without; ſo that the fartheſt extremity is very plainly ſeen from without, and the air within being agitated by the flux and

reflux of the tides, is perfectly dry and wholeſome, free entirely from the damp vapours with which natural caverns in general abound.

We aſked the name of it; ſaid our guide, The cave of Fiuhn: what is Fiuhn? ſaid we. Fiuhn Mac Coul, whom the tranſlator of Oſſian's works has called Fingal. How fortunate that in this cave we ſhould meet with the remembrance of that chief, whoſe exiſtence, as well as that of the whole epic poem, is almoſt doubted in England!

Enough for the beauties of Staffa; I ſhall now proceed to deſcribe it and its productions more philoſophically.

The little iſland of Staffa lies on the weſt coaſt of Mull, about three leagues N. E. from Jona, or the Columb-Kill: its greateſt length is about an Engliſh mile, and its breadth about half a one. On the weſt ſide of the iſland is a ſmall bay, where boats generally land: a little to the ſouthward of which the firſt appearance of pillars are to be obſerved; they are ſmall, and inſtead of being placed upright, lie down on their ſides, each forming a ſegment of a circle: from thence you paſs a ſmall cave, above which, the pillars now grown a little larger, are inclining in all directions: in one place in particular a ſmall maſs of them very much reſemble the ribs of a ſhip: from hence having paſſed the cave, which if it is not low water, you muſt do in a boat, you come to the firſt ranges of pillars, which are ſtill not above half as large as thoſe a little beyond. Over againſt this place is a ſmall iſland, called in Erſe *Boo-ſha-la*, ſeparated from the main by a channel not many fathoms wide: this whole iſland is compoſed of pillars without any ſtratum above them; they are ſtill ſmall, but by much the neateſt formed of any about the place.

The firſt diviſion of the iſland, for at high water it is divided into two, makes a kind of a cone, the pillars converging together towards the centre: on the other, they are in general laid down flat; and in the front next to the main, you ſee how beautifully they

they are packed together; their ends coming out ſquare with the bank which they form: all theſe have their tranſverſe ſections exact, and their ſurfaces ſmooth, which is by no means the caſe with the large ones, which are cracked in all directions. I much queſtion, however, if any one of this whole iſland of Boo-ſha-la is two feet in diameter.

The main iſland oppoſite to Boo-ſha-la, and farther towards the N. W. is ſupported by ranges of pillars pretty erect, and though not tall (as they are not uncovered to the baſe) of large diameters; and at their feet is an irregular pavement, made by the upper ſides of ſuch as have been broken off, which extends as far under water as the eye can reach. Here the forms of the pillars are apparent; theſe are of three, four, five ſix, and ſeven ſides; but the numbers of five and ſix are much the moſt prevalent. The largeſt I meaſured was of ſeven; it was four feet five inches in diameter*. The ſurfaces of the large pillars in general are rough and uneven, full of cracks in all directions; the tranſverſe figures in the upright ones never fail to run in their true directions: the ſurfaces upon which we walked were often flat, having neither concavity nor convexity; the larger number however were concave, though ſome were very evidently convex: in ſome places the interſtices within the perpendicular figures were filled up with a yellow ſpar; in one place a vein paſſed in among the maſs of pillars, carrying here and there ſmall threads of ſpar. Though they were broken, and cracked through and through in all directions, yet their perpendicular figures might eaſily be traced: from whence it is eaſy to infer, that whatever the accident might have been that cauſed the diſlocation, it happened after the formation of the pillars.

* As Mr. Banks's meaſurement and dimenſions of theſe and other remarkable pillars, and of Fingal's Cave, agree even to a ſingle figure with thoſe given by our accurate Author in pages 277, 278, 279, 281, 282, of this work, the repetition of them would have been uſeleſs; for which reaſon they are omitted.

From hence, proceeding along ſhore, you arrive at Fingal's Cave, which runs into a rock in the direction of N. E. by E. by the compaſs.

Proceeding farther to the N. W. you meet with the higheſt range of pillars, the magnificent appearance of which is paſt all deſcription: here they are bare to their very baſis; and the ſtratum below them is alſo viſible: in a ſhort time it riſes many feet above the water, and gives an opportunity of examining its quality. Its ſurface is rough, and has often large lumps of ſtone ſticking to it, as if half immerſed; itſelf, when broken, is compoſed of a thouſand heterogeneous parts, which together have very much the appearance of a lava: and the more ſo, as many of the lumps appear to be of the very ſame ſtone of which the pillars are formed: this whole ſtratum lies in an inclined poſition, dipping gradually towards the S. E. Hereabouts is the ſituation of the higheſt pillars. The ſtratum above them is uniformly the ſame, conſiſting of numberleſs ſmall pillars, bending and inclining in all directions, ſometimes ſo irregularly, that the ſtones can only be ſaid to have an inclination to aſſume a columnar form; in others more regular, but never breaking into, or diſturbing the ſtratum of large pillars, whoſe tops every where keep an uniform and regular line.

Proceeding now along ſhore round the North end of the iſland, you arrive at *Oua na ſcarve*, or *The Corvorant's Cave:* here the ſtratum under the pillars is lifted up very high; the pillars above it are conſiderably leſs than thoſe at the N. W. end of the iſland, but ſtill very conſiderable. Beyond is a bay, which cuts deep into the iſland, rendering it in that place not more than a quarter of a mile over. On the ſides of this bay, eſpecially beyond a little valley, which almoſt cuts the iſland into two, are two ſtages of pillars, but ſmall; however, having a ſtratum between them exactly the ſame as that above them, formed of innumerable little pillars, ſhaken out of their places, and leaning in all directions.

Having

Having paſſed this bay, the pillars totally ceaſe: the rock is of a dark brown ſtone, and no ſigns of regularity occur till you have paſſed round the S. E. end of the iſland (a ſpace almoſt as large as that occupied by the pillars) which you meet again on the weſt ſide, beginning to form themſelves irregularly, as if the ſtratum had an inclination to that form, and ſoon arrive at the bending pillars where I began.

The ſtone of which the pillars are formed, is a coarſe kind of baſaltes, very much reſembling the Giant's Cauſeway in Ireland, though none of them are near ſo neat as the ſpecimens of the latter, which I have ſeen at the Britiſh Muſeum, owing chiefly to the colour, which in ours is a dirty brown, in the Iriſh a fine black: indeed the whole production ſeems very much to reſemble the Giant's Cauſeway, with which I ſhould willingly compare it, had I any account of the former before me.

Thus much we have taken from Mr. Banks's account of the iſland of Staffa—which Mr. Pennant aſſures the public in a note to his Tour in Scotland (p. 269) was copied from his Journal; concluding in theſe words: "I take the liberty of ſaying (what by this "time that gentleman, meaning Mr. Banks, is well "acquainted with) that Staffa is a genuine maſs of "baſaltes, or Giant's Cauſeway; but in moſt re-"ſpects ſuperior to the Iriſh in grandeur."

We think Mr. Pennant might have ſpared his reader this information, as Mr. Banks, in his account, informs us, that it is a Giant's Cauſeway formed of coarſe baſaltes.

LETTER XXIII.

From Chevalier IHRE to Dr. TROIL,

Concerning the Edda.

Upſal, Oct. 21, 1776.

SIR,

ACCORDING to your requeſt, I ſend you an anſwer to the objections made by Mr. Schlozer againſt my opinion of the Edda, which, together with a tranſlation of my letter to Mr. Lagerbring, on the ſubject of a manuſcript of the Icelandic Edda, is, as you know, inſerted in that gentleman's Icelandic hiſtory.

It gives me great pleaſure to find that my thoughts on theſe ſubjects have been examined by men of learning in Germany, by which means a number of falſe notions that had been formed on the ſubject and deſign of this book have been removed; and I am very happy to receive any objections

objections which may tend to convince me that I have been miſtaken.

Though I now reſume the pen, it is not ſo much with any immediate deſign to refute thoſe objections that have been made againſt me, as to give thoſe accounts and explanations required of me, and which I think myſelf more capable of doing than any other perſon, as I can command the codex, whenever I think proper. Mr. Schlozer and I propoſe the ſame end to ourſelves; namely, the inveſtigation of truth.

Mr. Schlozer's firſt objection is, that I have not given a complete deſcription of the manuſcript, its ſize, &c. He is perfectly right in this point, and I will briefly endeavour to repair this difficulty; but firſt, I muſt obſerve a diplomatic deſcription was not ſo much required in that letter, as I had directed my attention more to the contents of the book than its external appearance.

I intended to ſhew what was the view of the author of the Edda in compoſing this work, what parts belonged to it, and which did not, where-

in our manuſcript differed from Reſenius's edition, whence the book had obtained the name of Edda, &c. but its diplomatical deſcriptions would have afforded no information in any of theſe articles. This letter was beſides not addreſſed to any foreign man of learning, but to one of my learned countrymen, well verſed in antient literature, who had frequently this manuſcript in his own hands, and examined it, and was perhaps better acquainted with it than myſelf. It would have been very ſuperfluous to tell him it was written in antient characters, in the Icelandic language, and on parchment.

But to oblige Mr. Schlozer, and perhaps many others, I will inform them that this codex, as I ſaid before, is wrote upon parchment, the colour of which is dark brown, that may proceed partly from its antiquity, and partly perhaps from its having been long kept and made uſe of in the Icelandic ſmokey rooms. It is in very good preſervation, and in general legible. It is true, there are

ſome

ſome round holes in the parchment, but theſe ſeem to have been there at firſt, as no part of the text is loſt by them. The ſize is a ſmall quarto, one finger in thickneſs, containing fifty-four leaves and a half, or one hundred and nine pages, beſides a white leaf before and one behind, on which there are, however, ſome bad figures; theſe figures on the firſt repreſent Gangleri, who propoſes, with Harja-ſuhar and Thridi, to reſolve other queſtions. The characters are old, and, when compared with many others, ſeem to prove that the copyiſt lived about the beginning of the fourteenth century. But all this is of very little importance. Mr. Schlozer believes his ſubſequent queſtions may give more light in ſettling the principal point, as they tend to diſcover who was the author of the Edda, and what really belongs to it.

He is therefore more curious to know what is contained in this codex. Mr. Schlozer believes he has ſo much more reaſon for putting this queſtion, as I myſelf have hinted, that beſides Damiſagor, Kaningar, and Liodſ-

greimir,

greimir, it contained a liſt of Icelandic lagmen, and a *langfedgatal* or genealogy of Sturleſon's anceſtors. He therefore deſires to know if this codex is not a magazine of all kinds of Icelandic works, which have been accidentally collected into one volume, and bound together? I anſwer to this, if the caſe were thus, Mr. Schlozer might have expected from a man who acted with candour and ſome knowledge of the matter before him, that he would not have omitted this circumſtance. I therefore now declare that there is nothing elſe in it, but what has already been mentioned; unleſs I add, that p. 92 and 93, after the author has deſcribed the general rules of poetry, and the nature of letters, and the copyiſt has left half a blank page before he writes the names of all the different ſorts of verſification uſed in the Icelandic poetry, another hand has patched in a ſteganographical writing, that I did not know what to make of during a long time, and indeed I did not take great pains to decypher it.

I will,

I will however give a ſpecimen of it: *dfxtfrb ſcrkptprks bfnfdktb ſkt pmnkbxs hprks.* As I was reading in Vanly's Bibliotheca Anglo Saxonica, I accidentally met with a ſimilar collection of conſonants, with a key affixed to it, which ſhewed that the whole ſecret conſiſted in placing, inſtead of each vowel, that conſonant which in the alphabet followed next to it; alſo inſtead of *a, e, i, o, u, y,* the letters *b, f, k, p, x, z,* were put; and according to this rule the afore-mentioned riddle ſignified, Dextra ſcriptoris benedicta ſit omnibus horis.

I afterwards found the ſame kind of ſteganography mentioned in a little work aſcribed to Rhrabanus Maurus, under the title of De Inventione Litterarum, and which is ſo celebrated on account of the proof contained in it of the runes of the Marcomans. After letters became more univerſally known among the people, the ſubtle monks however, deſirous of knowing ſomething that the vulgar were unacquainted with, invented various myſterious ways of writing in this man-

manner, which they not only make uſe of among themſelves, but introduced in their public writings. This taſte met with admirers among our anceſtors in Sweden, and thence we find ſo many kinds of what are called *villrunes* that were unintelligible to the vulgar. See in Bautil, N° 25, 205, 331, 361, 539, 568, 571, 572, 581, 648, 748, 767, 817, 819, 822, 1001, 1088, and many more in Wormius. Perhaps what we call among us *helſinge runes*, have alſo no other origin, as the greater part of them only differ from the common runes, by having the ſtaff taken away. It is however remarkable that our gravers of runes even made uſe of this cryptographys in monuments erected to the memory and honour of the deceaſed.

It is further aſked, if there are any external or internal traces of the copyiſt having conſidered all the abovementioned pieces, or at leaſt the three firſt parts, as a connected work?

The anſwer to this may be found in the title of the book, which is at length

in

in the Goranſon edition, and runs thus:

Bok theſſi heiter Edda. Henne hever ſam ſetta *Snorri Sturlo* ſ. epter theim hœlti, ſem her er ſhipat. En fyrſt fra Aſum ok ymi; tharnaeſt ſkalld ſkapar mal ok heiti marga hluta. Sidaz hœttartal, er *Snorri* hever ort um *Hakon* k. ok *Skula* Hertuga; that is, This book is called Edda; and has been compoſed by Snorre Sturleſon, in the manner it now ſtands: viz. firſt of the aſes and ymi, afterwards the language of poetry, and its appellations of various things. Laſtly, a diſſertation of the verſifications Snorre made upon king Hakan and duke Skule.

I mentioned in my letter to Mr. Lagerbring, that the Rubric was wrote in a later hand; which is right, ſo far as has been added after the Edda itſelf was begun, as may be ſeen by the narrow ſpace left for it, ſo that it has forced the copyiſt to bring the laſt line into that immediately preceding it. Beſides, I clearly perceived that the manuſcript

ſcript was very old, and that no reaſonable eye-witneſs could believe it was written in 1541, as Mr. Schlozer conjectures. But as it had been written with red ink, which had preſerved its colour better than the black, I then believed the hand had been ſomewhat more modern; but as I have now very minutely compared the writing in the Rubric with that of the Edda, I think I may ſafely affirm, that they are both written by one and the ſame hand. From hence it follows, that he who copied the Edda conſidered the above-mentioned articles, and no others, as eſſential parts of it.

I am come to the principal queſtion, whether Sturleſon is the author of the Edda? Here Mr. Schlozer ſeems to have taken moſt pains, to prevent me from deceiving the learned world in this point.

Becauſe Mr. Schlozer has found that moſt antiquarians expreſs themſelves with a kind of circumſpection when they ſpeak of the Edda and its author, and inſtead of poſitively declaring Sturle-

Sturleſon the author, as Arngrim and ſome others have done ; only ſay, Creditur, exiſtimatur auctor fuiſſe : that is, he believes the matter to be at leaſt dubious, if not totally groundleſs.

I will not inſiſt upon it, that there is at leaſt more affirmation than negative in theſe expreſſions, eſpecially as it is uſual, on mentioning an evidently falſe opinion, to add, falſo creditur, or ſomething ſimilar. For Mr. Schlozer himſelf remarks very judiciouſly, that the opinion of theſe men is of very little importance, when they alledge no grounds for it. He therefore believes himſelf entitled to maintain with certainty, that Sturleſon has falſely been thought the author of the Edda. To ſupport his opinion, he mentions three arguments in different places, which I muſt now examine more cloſely.

The firſt argument is to be met with in p. 39, where Mr. Schlozer ſubmits it to conſideration, whether the ſerious Snorre, overcharged with ſtate affairs, could be ſuppoſed to have had time, and did not think it beneath his dignity

nity to write an Aerarium poeticum, and become the predeceſſor of Weinreich? Here I will only obſerve, that Snorre was not conſtantly lagman, and that he might have compiled this work before he obtained this dignity, or in the interval between the firſt and ſecond adminiſtration of this conſiderable charge; and laſtly, even in its vacancies. Neither Mr. Schlozer nor I are able to determine how much time the management of a lagman's office requires. They hold ſeveral yearly court-days or aſſizes, after which I have always underſtood that they are entirely free and diſengaged; ſo that I may fairly infer, that the lagmen are not troubled with the examination of tedious records, or are employed in any extraordinary works. We find many Icelandic lagmen who have been poet laureats in Sweden and Norway, as Marcus Skaggaſon, Sturle Thordarſon, and others. If Mr. Schlozer's argument was concluſive, he might go ſtill farther, and prove, that Sturleſon could neither have written the Heimſkringla, or hiſtory of the northern kings, which required ten times

more time, and more laborious diſquiſitions, than the Edda.

Mr. Schlozer founds his ſecond argument on his believing it incredible, that any one in the golden age of poetry in Iceland ſhould preſume to advance ſuch abſurd things as I have done in my letter. He therefore believes the Edda to be a production of later times, when poetry was in its decline in Iceland.

To underſtand the whole force of this argument, it muſt be known, that Mr. Schlozer divides the Icelandic literature into three periods; the ſimple period, from the beginning to the introduction of Chriſtianity; the golden period, from the introduction of Chriſtianity to the cloſe of the thirteenth century, when the black death or the great plague, as well as the ſubjection of the Icelanders to the crown of Norway, checked the progreſs of poetry; and the laſt, from that period to the preſent. I will not ſtrictly examine this diviſion, though I cannot comprehend that the introduction of

Chriſtianity could contribute to the improvement of poetry; and ſtill leſs, if the diger-death, which raged in the middle of the fourteenth century, produced the ſame effect on the ſurviving poets, as on the cultivation of the country and its population. But this I am clear of, that any one who would attempt to claſs the Icelandic poets with any degree of certainty, muſt be perfectly well acquainted with their language, and be able to weigh the faculties of their minds againſt each other.

It ſignifies very little under what particular dynaſty the poetry of the Chineſe moſt flouriſhed, ſo long as we are able to underſtand their poems without the aſſiſtance of an interpreter.

As to the paſſages of Icelandic poets that I have quoted in different places, they prove not a tittle of what Mr. Schlozer pretends they do. For Lopt Gutormſſon's verſes are not in the Edda; and though the other ſong is to be met with in Reſenius's edition of it, yet it is not in the Upſal manuſcript. It is therefore not known to what

what period they belong; and they cannot by any means be made uſe of as proofs to ſhew, that Snorre was not the author of the Edda. It is highly proper to be well acquainted with a ſubject before one ventures to treat of it.

I will by no means preſume to defend all the phraſes I have made uſe of; though it is well known that cuſtom has introduced them into every language, which, were they tranſlated into other languages, would not only loſe their original beauty, but appear aukward and graceleſs. For example, it would not be believed that to tread the ſtars under foot ſignified to be exalted and happy; nor would any one be underſtood who would, to expreſs a doubtful ſtate of mind, call it hanging water. And theſe phraſes, not to mention an infinity of others, were however in conſtant practice among the Latins.

But as to our antient anceſtors in particular, who indubitably originated from the Eaſt, they no doubt brought

their allegorical expreſſions from thence. And, in my opinion, the fondneſs of the antients for riddles did not contribute a little to theſe metaphors in ſpeech; for their merit frequently conſiſted in the moſt perverted expreſſions, which in proceſs of time were revived and admired as beauties. We are not permitted the liberty to judge without diſtinction in mere matters of taſte and genius, though they widely differ from what is practiſed in other nations.

Mr. Schlozer takes this third and laſt, and perhaps worſt argument from the contradiction which I have obſerved between the Edda and Snorre's Heimſkringla. I wanted to ſhew in my letter, that the antients by their Aſgard meant the town of Troy; and this I can prove, by the one having maintained the ſame things of Aſgard as the other does of Troy. My opinion therefore is, that Troy and Aſgard muſt neceſſarily ſignify one and the ſame place, unleſs we admit that Sturleſon has contradicted himſelf.

It

It may eaſily be apprehended, that what I have mentioned by no means implies that there was a contradiction between the Edda and Heimſkringla, but only that the above cited place had been called by two different names. Mr. Schlozer cannot poſſibly be ignorant of the meaning of argumentationes ab abſurdo.

Hitherto I have mentioned the arguments with which Mr. Schlozer endeavours to ſhew, that Sturleſon is not the author of the Edda; but now to prove the contrary on my ſide, I will content myſelf with one ſingle argument, that is of ſuch a nature as to make all others unneceſſary. In the ſuperſcription ſubjoined to our Codex, the copyiſt roundly affirms Sturleſon to be the author of this work; and his teſtimony is ſo much the more undeniable, as the nature of the copy itſelf proves, that it cannot be later than the 14th century; and that an Icelander had made it on the ſpot, who certainly would not have thought it worth his attention and time to copy a work, if he had not known the author of it.

That this was the general opinion of the Icelanders, I think, may be proved thus; that though various conjectures are generally made concerning the author of an anonymous work, there are hardly any except Sturleſon mentioned as the author of the Edda.

I cannot on this occaſion paſs over in ſilence what I have read in p. 326 of the Daniſh Journal, publiſhed by Mr. Lilie, in 1756; namely, that the celebrated Arnas Magnaus, in a written account left us by Sumundr Frode, was of the ſame opinion as Mr. Schlozer, that Sturleſon was not the author of the Edda.

The arguments that he makes uſe of ſeem to carry ſome weight with them; that in the laſt part of the Edda, called *Liodſgreimir* or *Skallda*, Sturleſon is not only quoted, but alſo recommended as a pattern to the poets; and that in this part mention is likewiſe made of the kings Hakan Hakanſon, Magnus, Erich, and Hakan Magnuſſon, who all lived later than Snorre. This argument at firſt ſight ſeems to be deciſive, but loſes its whole

whole force upon a nearer examination. The true ſtate of the matter is this:

In the beginning of *Liodſgreimir* the author of the Edda ſays, that he has three different heads to treat upon; viz. the rules of poetry, its licences (licentia poetica), and its faults (vitia carminum), *ſettning*, *leiſe*, and *ſyrerbodning*. The two firſt of theſe ſubjects are perfectly diſcuſſed in the Liodſgreimir, but the laſt is wanting. A later writer has attempted to make up this deficiency, and has therefore made a ſupplement to Sturleſon's Edda. It is not in the leaſt extraordinary that he ſhould have mentioned Sturleſon, and given him his merited ſhare of praiſe; but that this ſupplement does not belong to the genuine Edda, is proved by the Upſal manuſcript, where it is entirely wanting.

In this manner it may be explained what is ſaid of the ſucceeding kings: they are never mentioned in the Edda; and I am much miſtaken if Arnas Magnaus has not taken them from the *Skaldetal*, or liſt of poets, where the

are all taken notice of. The *Skaldetal* was no more than a ſupplement to the Edda, as I ſhall make it appear preſently. If therefore the learned Magnaus had ever ſeen our Codex, he certainly would not have entertained this opinion.

In regard to theſe appendixes, I am perfectly convinced that the catalogue of *Lagmen* and the *Langfedgatal*, or genealogy, are the works of Sturleſon himſelf. The ſubject contained in them refers entirely to Snorre, who was both Lagman and a deſcendant of the Sturlunga family. The *Aettartal*, or genealogical table, which from the beginning deſcends in a ſtrait line from the fathers and mothers ſide to the ſons, at Sturle extends to all the children, and daughters children; yet in ſome inſtances even there not to all theſe, but moſt probably to thoſe only who were alive when this genealogical table was compoſed. The ſame is to be obſerved in the catalogue of the Lagmen, where it is very accurately mentioned how long every one of them poſſeſſed their place; but at the

the family of Snorre the catalogue ſtops without obſerving how long they maintained this charge the laſt time. It is therefore impoſſible that this genealogy ſhould have been compoſed before Snorre's time; nor is it leſs improbable that any one ſhould have omitted in later times to add the ſixteen years during which Snorre was Lagman the laſt time; or that he ſhould have forgot to mention this circumſtance of him in the whole liſt of Lagmen, who was the moſt conſiderable of them all.

I will in this place add, that it was very common, not only in the North, but even in other parts, to ſubjoin ſuch liſts, genealogical tables, and the like, to larger works, in order to reſcue them from oblivion, and prevent their being totally loſt to poſterity. In the ſame manner the copyiſt of our Weſt Gothic law had added to it a *Konunga Längd*, or liſt of kings, as likewiſe a liſt of the biſhops of Skara and Lagmanner in Weſt Gothland. Are Frode has in like manner affixed his genealogy to his Schedis,

Schedis, or *Iſlandiga bok*, and ſeveral others.

It is more difficult to determine ſomething concluſive concerning the third appendix, or *Skaldetal*. I have always been of opinion, that it was begun by Snorre, as it commonly follows the Edda, and that it was afterwards augmented by one or more perſons: Wormius did the ſame by a poem written by Saxo Hiarne, who obtained by that compoſition the regal dignity in Denmark, though as a Dane he was not properly intitled to be placed in the liſt of Icelandic poets.

That this catalogue was the work of ſeveral hands may in my opinion be perceived by more than one indication: immediately in the beginning it is ſaid, that Starkotter was the firſt of the Skalds, whoſe verſes the people had learned by heart; and in the end a certain *Ulfver hin Oarge* is cited as the firſt, who, according to Mr. Schoning, lived in the ſecond century, and conſequently muſt have been ſeveral centuries older than the abovementioned Starkotter. Theſe two

accounts can hardly be ſuppoſed to proceed from one and the ſame author.

It is beſides incontrovertible, that what is ſaid of the laſt Norwegian kings correſponds not with the time of Snorre. It would be of eſſential ſervice if a man of Mr. Suhm's merit and abilities would critically examine this Skaldetal, and compare it with Wormius's liſt of poets, that differs ſo widely from it in ſeveral points.

This at leaſt may be perceived by every one, that the Skalds therein mentioned have not all lived in the thirteenth century; but that a great part of them exiſted in the tenth, eleventh, and twelfth centuries. The 230 Skalds, who, according to Mr. Schlozer's reckoning, lived in the thirteenth century, may be conſiderably reduced in number, by one and the ſame Skald being mentioned in three or four different places, as if he had been in the ſervice of as many maſters. It is very remarkable that ſome of theſe Skalds, as Oltar Svarte, Sigvatur Thordarſon, and others, have been received

received as poet laureats in all the three northern courts.

Nor is it leſs remarkable, that ſome of theſe Icelandic Skalds were taken into pay at the Engliſh court, by kings Altheſtan and Ethelred: this would require an examination to diſcover how their *Skaldſkaparmal*, or poetical language, could be underſtood in a foreign country, as both languages, without theſe poetical figures, differ ſo widely from each other, as is evident from the remains of both.

It is laſtly aſked, if there are any internal or external marks, from which it might be gueſſed that the three parts of the Edda mentioned by me belong to one another, and form one work? but this queſtion is anſwered by the title quoted above, wherein all the parts are clearly enumerated.

In regard to the third part, called *Liodſgreimir*, Mr. Schlozer deſires to know how this title ſuits to an ars poetica?

I have already in ſome meaſure anſwered this queſtion in my letter to

Mr.

Mr. Lagerbring, by citing the ſtrange titles the antients ſometimes prefixed to their books. However, that a more clear idea may be formed of what relates to this appellation, it ſhould be obſerved, that Sturleſon immediately in the beginning divides all ſounds or tones into three kinds. The firſt he calls *vittlaus hliod*, or the ſound of inanimate things, as of thunder, waves, wind, and the like; to the ſecond he reckons the ſounds of irrational animals; and to the laſt, the articular ſounds of men, which are produced by means of the tongue, lips, palate, &c. He then ſpeaks of the ſound of the letters, how ſome are long, others ſhort; ſome conſonants, and others vowels and diphthongs: and then proceeds to the rules of proſody, and whatever elſe belongs to the Icelandic *ſkaldſkap* or poetry.

From hence it may be ſeen what has given riſe to this appellation; *Liodſgreimir* literally ſignifying no more than diſtinction of ſounds. Sturleſon has given as ſtrange a title to this

this Northern hiſtory, which he calls *heimſkringla*, and this from no other reaſon, but becauſe it was the firſt word with which the book began.

LETTER

LETTER XXIV.

From Chevalier BACH to Dr. TROIL.

Of the Icelandic Scurvy.

Stockholm, June 12, 1776.

SIR,

THE accounts with which you have favoured us of the diſeaſes that abound moſtly in Iceland muſt be of univerſal ſervice to the Swedes. When I had the pleaſure and happineſs of converſing with you on this ſubject, my attention was peculiarly raiſed by the information you gave me of the Icelandic ſcurvy, and of its dreadful conſequences on thoſe perſons who were affected with it.

What Mr. Peterſen calls the Icelandic ſcurvy, is the true elephantiaſis, which is nearly related to the leproſy. Celſus has deſcribed it in the days of Auguſtus under the name of elephantiaſis; and yet Aretæus has treated more fully upon it, in ſect. 5, under the ſame

ſame name. It is more terrible than any other diſeaſe, producing frequently a dreadful end: it gives a diſguſting appearance to the patient, as the body by its colour, roughneſs, and ſcaly appearance, reſembles the ſkin of an elephant. Whoever compares your and Mr. Peterſen's deſcription of this diſeaſe with that of the antients, will not find it an eaſy matter to take the Icelandic ſcurvy for any thing elſe but the elephantiaſis. In my opinion, both Ettmuller, as well as Boerhaave and his famous commentator baron Van Swieten, would have done better not to call the elephantiaſis the higheſt degree of the ſcurvy, or that they had not confounded thoſe two diſeaſes, ſo different in their beginning, progreſs, nature, and remedies.

Thoſe among us who have written of the theory of diſeaſes, have with more propriety given the name of ſcurvy where a gradual increaſing languor takes place, together with a bleeding, ſtinking and putrid breath, and many coloured blackiſh-blue ſpots on the

body, particularly round the roots of the hair, and which principally proceeds from corrupted ſalt animal food, and the want of vegetables. The elephantiaſis, on the other hand, which is alſo called *Lepra Arabum*, is rather an hereditary diſeaſe; the ſkin becomes thick, unequal, gloſſy, and loſes its ſmoothneſs; the hair falls off, languor and want of feeling take place in the extremities; the face becomes diſguſting and full of biles, and the patient gets a hoarſe naſal voice. In the real leproſy (impetigo, lepra Græcorum) the ſkin becomes wrinkled and full of ſcales, which ſeem to be ſtrewed with bran, often burſt, itch exceedingly, and are filled with a watery moiſture.

Mr. Sauvage mentions ſeveral ſorts of elephantiaſis; but it is a queſtion whether they all differ or not, as he might have multiplied their number. I believe that the elephantiaſis mentioned by Cleyer in his Eph. Nat. Curioſ. and Sauvage's javaneſe elephantiaſis are very like to the Icelandic. At leaſt it is certain that the elephan-

tiaſis in Madeira, which Dr. Thomas Heberden deſcribes in the firſt volume of his Medical Tranſactions, almoſt one hundred years after Cleyer, is entirely the ſame.

It is very remarkable that this diſeaſe has preſerved its nature ſo perfectly in the moſt northern parts during more than a hundred years, and remained intirely ſimilar to that in the hotteſt climates. The ſame diſeaſe appears at Martigues in Provence, and has been deſcribed by Dr. Johannes in the firſt volume of the Medical Obſervations and Inquiries: that it has been in the Ferro iſlands, may be ſeen in the firſt volume of Bartholin's Actis Hafnienſibus.

The diſeaſe obſerved in Norway, which Mr. Anthony Rol. Martin deſcribes in the Tranſactions of the Swediſh Royal Academy of Sciences, in the latter end of the year 1760, may likewiſe be reckoned amongſt this claſs; as alſo that which appeared in ſeveral parts of Sweden, and of which Mr. Aſſeſſor Odhelius gives an account in the third part of theſe Tranſ-

actions

actions for the year 1774; all these may very properly be compared to Mr. Sauvage's Elephantiasis Legitima.

It was believed in the most early times, that this disease had taken its rise in Egypt; and Lucretius positively says, that it is was first discovered on the Banks of the Nile. In Celsus's time it was not at all known in Italy; however Pliny relates, that it was first brought into that country by the army of Pompey, from Egypt and Syria, but did not remain there long. In the twelfth century it was brought to Europe the second time by the Crusaders, and is frequently mentioned in the publications of the thirteenth, fourteenth, and fifteenth centuries: it was not however very violent in the fifteenth and sixteenth centuries; and in the seventeenth century it seems to have intirely disappeared in England, France, and Italy, when all the Lazar-houses, that had been built on purpose to receive patients infected with this disease, became useless.

But how did this dreadful disease come from the South, where the dis-

eaſes connected with an eruption are moſt frequent, ſo far to the North? Could it not alſo have happened by means of the Cruſades, our forefathers in the North having had likewiſe the honour to partake of them? Nay, even the Icelanders were not excluded from a ſhare. The oldeſt Icelandic writings give us examples of the elephantiaſis in Norway, and other northern countries, as may be ſeen in the firſt volume of Olafsen's Voyage to Iceland, page 172. But it ſtill remains a query, whether it was the true ſcurvy or not, which the learned author found mentioned for the firſt time under the antient Norway and Icelandic name of *ſkyrbjugur*, that appeared in the Norway fleet in the year 1289, during the war of king Ehrick with Denmark. For according to Mr. Peterſen's teſtimony, the word *ſkyrbjugur* is to this day frequently made uſe of to expreſs the elephantiaſis; though I muſt confeſs that the ſcurvy ſeems to be a common diſeaſe among the fleets in thoſe days as well as in ours. However it would be uſeful

uſeful for the hiſtory of the diſeaſes common in the North, if the origin of them could be determined from theſe old accounts, eſpecially as theſe accounts of the ſcurvy are two hundred years older than any we have been yet able to diſcover. We may moſt probably expect this diſcovery from our neighbours in Denmark and Norway, who elucidate the northern hiſtory from antient accounts with ſo much zeal and happy ſucceſs.

Mr. Anthony Rol. Martin relates, that in the above-mentioned place the number of perſons in Norway infected with this diſeaſe, in the year 1759, amounted to 150, for whom three hoſpitals were erected; and Mr. Peterſen fixes the number of thoſe who were ill of it in Iceland in the year 1762 at 280 perſons, for whom four hoſpitals were eſtabliſhed.

You may aſk, Sir, how this diſeaſe came to be ſo firmly rooted in Iceland, as it has ſo decreaſed in the South, that it has almoſt diſappeared there?

I believe that this is not ſo much owing to the climate as to the manner of life and diet. People whoſe continual occupation is fiſhing, are night and day expoſed to wet and cold, frequently feed upon corrupted rotten fiſh, fiſh livers and roe, fat and train of whales, and ſea-dogs; as likewiſe congealed and ſtale ſour milk: they often wear wet cloaths, and are commonly expoſed to all the hardſhips of poverty. The greater number of theſe are therefore to be met with in this claſs: on the contrary, where leſs fiſh and ſour whey are eaten, and more Icelandic moſs (lichen Iſlandicus) and other vegetables, this diſeaſe is not ſo prevalent, according to an obſervation made by Mr. Peterſen in the above-mentioned Tranſactions.

We have a very remarkable inſtance of the great effects of diet on the diſeaſes of a nation, in the inhabitants of the iſles of Ferro. Since fiſhing has declined among them, and the inhabitants have cultivated corn, and live upon other food inſtead of whale's fleſh and bacon,

bacon, the elephantiaſis has intirely ceaſed among them, according to Mr. Peterſen's account. Things bore a very different aſpect there ten years before this alteration: as a proof, I will quote Mr. Debe's own words from the firſt volume of the Act. Hafn. pag. 98. Elephantiaſis in inſulis Ferröenſibus frequens ex victu et aëre, has habet notas; facies et artus hic fere ubique foedantur tumoribus plumbei coloris, qui exulcerantur foedum in modum. Rauci ſunt hoc morbo infecti, et per nares vocem emittentes. Vere et autumno invaleſcens morbus plurimos enecat.

Experience likewiſe teaches us, that the greater number of perſons labouring under this diſorder in our country reſide near the ſea-ſhore, in the diſtricts of Abo and Oeſterbottn, and in the iſles ſcattered round the ſhore, who in general get their livelihood by fiſhing and catching ſea-dogs: from what has been ſaid before it may be learnt what is proper to be done gradually to remove this deſtructive diſeaſe. But I will reſerve

for another occaſion whatever relates to this diſeaſe in Sweden.

About a hundred years ago plagues and peſtilential fevers raged in Europe, as may be ſeen in the accounts of ſeveral phyſicians of the epidemical fevers that prevailed at certain times. But at preſent, when a better police has procured us more cleanlineſs in the ſtreets and narrow lanes; and more neatneſs is obſerved in our apparel and habitations; as alſo ſince beer prepared with hops, wines, and other liquors are drank, which are very ſalutary, though they produce other diſeaſes when made uſe of in exceſs; ſince fruits and vegetables, tea and ſugar, are become faſhionable; theſe and ſimilar diſorders are greatly diminiſhed. Sir John Pringle proves the truth of theſe remarks, accompanied with ſeveral examples, particularly with reſpect to the diſeaſes of England, in his Obſervations of the Diſeaſes of an Army.

It is very probable that the elephantiaſis, and many other great diſorders in the ſkin, quitted the ſouthern coun-

countries from ſimilar cauſes; and have on the contrary maintained themſelves towards the North, where a ſufficient quantity of bread cannot be provided for the natives, and where the lower ſort of people, who live entirely by fiſhing, do not eat any vegetable food, but only feed upon rancid oily victuals; and are beſides unable to keep themſelves clean and neat, being continually expoſed to wet and cold on the ſea-ſhore, &c,

I ſhould repeat the obſervations which have been made upon this diſeaſe in Iceland, as they might perhaps ſerve to make our countrymen better acquainted with the diſorder itſelf, and the manner of curing it. But you, Sir, might perhaps tell me, that this is a more proper ſubject for a phyſical book than for letters concerning Iceland; for which reaſon I will be as conciſe a poſſible.

Mr. Anthony Rol. Martin has given ſo exact an account of this diſeaſe, that I need not here enumerate its ſymptoms. Whoever compares it with

with Mr. Peterſen's little diſſertation, will become perfectly acquainted with the elephantiaſis, its beginning, progreſs, and greateſt height; and will readily allow, that the Icelandic name of *liktraa* is given it with great propriety, which ſignifies, that thoſe who are infected with this diſeaſe in its higheſt degree, reſemble a putrefying corpſe more than a living man.

The elephantiaſis is either inherited from the father or mother, who are afflicted with it, or it is not inherited. In the firſt caſe, the diſeaſe frequently appears before the child is two years old, and always before the age of twenty-five, ſo that ſuch perſons ſeldom live to ſee thirty years. The ſooner the diſeaſe makes its appearance, the ſooner the patient becomes a prey to death. But thoſe who have not inherited the elephantiaſis, but have brought it upon themſelves by their mode of living and other cauſes, may drag on a wretched exiſtence during twelve or fourteen years, and ſometimes longer. The elephantiaſis is of the ſame nature in the South.

Before

Before this diſeaſe breaks out on any perſon, his breath is diſagreeable and ſtinking for three, and ſometimes ſix years preceding: he has a great appetite to eat ſour, half-rotten, and unwholeſome food; is always thirſty, and drinks very much: ſome are ſloth-ful and ſleepy, and when aſleep are with great difficulty awakened; are ſhort-breathed when the complaint aſ-cends upwards; they ſpit very much, and complain of wearineſs in their knees. They ſhiver violently when they come out of a room into the open air; the eyes and lips become of a brown and blue colour: they have a weak ſmell; with ſome the feeling is likewiſe numbed; others have weak ſight; and ſome loſe it entirely, when their foreheads begin to ſwell in the beginning of the diſeaſe. They have frequently thin hair, particularly on the eye-brows; the beard likewiſe grows very thin on both ſides of the chin, and the ſkin becomes gloſſy, as if it had been rubbed over with greaſe.

This

This diſeaſe is not found to be particularly infectious in Iceland: as a huſband afflicted with it does not infect his wife, nor a diſeaſed wife her huſband. The children may likewiſe be brought up without danger in the houſe of their diſeaſed parents. But it has been found by experience, that when one of the parents is infected with it, ſome one or other of the children always catch it. It is the ſame thing in Madeira, as Dr. Heberden obſerves. Dr. Johannes informs us that at Martigues in Provence, when one of the parents has the diſeaſe, one of the children or grand-children, or a deſcendant in the third degree, is certainly infected with it; but in the fourth degree it again diſappears, and only ſhews itſelf in a bad breath, hollow teeth, ſwelled throat, and a darker colour than uſual.

The more antient writers who have treated of this diſeaſe, frequently relate, that people were even afraid of being infected by converſing with thoſe who were troubled with it. The diſeaſe muſt therefore either have been more

more violent in the beginning, and in the ſouthern countries, as the venereal diſeaſes were formerly in the beginning of the infection; or the diſeaſe having but lately made its appearance, cauſed more apprehenſions. It is, however, always adviſable to be cautious in converſing with ſuch patients, and neither to wear their ſhoes or cloaths, when they have been rendered wet with ſweating. When the diſeaſe is arrived at ſo high a pitch that the matter which flows from the ſkin is corroſive, and eats into the fleſh, it can no longer be denied, but that it then becomes infectious, and even dangerous to converſe too near with the patient.

As the elephantiaſis, when it has attained its greateſt height, is incurable, according to the teſtimony of antient and modern phyſicians; it is ſo much the more neceſſary to notice the beginning of the diſeaſe, and the time preceding it, in order to prevent the danger.

A patient who finds himſelf in theſe circumſtances, or lives in a place where

the diſeaſe is rife, or has any other cauſe to believe that he has the leaſt veſtige of it exiſting in his body, either by inheritance, or through his own fault, ſhould, both in his diet and in his whole manner of life, avoid whatever is likely to contribute to it, or render his body more liable to receive the infection, with the utmoſt caution. He muſt keep himſelf extremely clean; immediately put on dry cloaths, whenever thoſe on his back become wet; eat no other food but what is eaſily digeſted, and abſtain from all oily rancid whale's fleſh, and the like. He muſt eat no half-rotten fiſh, nor their inteſtines and livers, eſpecially if they are in a putrid ſtate: on the contrary, he muſt confine himſelf to bread, roots, green herbs, cabbages, turnips, and ſallad of gentiana campeſtris, ſorrel (rumex acetoſa, L.) rumex criſpus, &c. &c. He muſt eat ſoups, boiled freſh meat, with ſcurvy-graſs, ſedum acre, and the like. He muſt make uſe of baths of the decoction of juniper, dry baths of juniper, &c. In the ſame manner antimonial remedies would be very

uſeful; and even Swieten's mercurial mixtures, pills of an extract of hemlock (pilulæ alterantes Plumerii) and ledum paluſtre. I have likewiſe obſerved with pleaſure, that a girl in the pariſh of Weſter Hanninge was cured of a commencing elephantiaſis in the year 1774, by making uſe, during a long time, of Huxham's antimonial eſſence, with a decoction of antiſcorbutic herbs.

But every one will eaſily apprehend, that poor wretched people, who are naturally moſt expoſed to theſe and the like diſeaſes, are likewiſe entirely incapable of averting them by obſerving a proper diet and manner of life, which are, however, almoſt the only remedies. Beſides, theſe kind of people are generally careleſs of any illneſs ſo long as they are able to ſtir; they likewiſe ſeldom conſult a phyſician, and when they do, it is out of their power to follow his preſcriptions exactly. Some perſons attacked with it have, however, been freed of it, after having had the ſmall-pox. It might, therefore, be conjectured, that patients

afflicted

afflicted with the elephantiaſis, if they had not had the ſmall-pox, would be benefited by inoculation.

Some who have had this dreadful diſeaſe have gone from Iceland to Copenhagen, where they have happily experienced a cure. I will likewiſe mention, in juſtice to Dr. Thomas Heberden, that he is the only phyſician known to have cured the elephantiaſis, after it had attained a very high degree. His manner of cure is this: he firſt mixes an ounce and an half of powder of bark, with half an ounce of ſaſſafras root, and then adds as much ſimple ſyrup as is neceſſary to make the whole into an electuary; of which he gives the patient two portions a day, of the ſize of a nutmeg: he cauſes the hands of feet to be rubbed morning and evening with a mixture, conſiſting of eight ounces of brandy, an ounce of lye of tartar, and two ounces of ſpirit of ſal armoniack. He laſtly cauſes bliſters to be conſtantly laid between the ſhoulders. This method regularly purſued ſucceeded in the courſe of five months, after

after he had previouſly made uſe of antimony, mercury, and the like during the full period of ſeven years, without any laſting amendment. But I have already ſaid too much of this loathſome diſeaſe.

Sed quænam medela excogitari poterit, quæ elephantem tam ingens malum expugnare digna ſit? *Aretæus.*

LETTER XXV.

From Profeſſor BERGMAN to Dr. TROIL.

Of the Effects of Fire, both at the Volcanos and the hot Springs; and alſo of the Baſalts.

Stockholm, June 12, 1776.

SIR,

YOU have been ſo kind as to communicate to me your obſervations on Staffa and Iceland, and to deſire my opinion of their natural curioſities. It would be very ungrateful if I heſitated to comply with this requeſt, as you preſented me with the intire collections you made there, that I might chemically examine the nature of each. Mere obſervations, without the aſſiſtance of an exact knowledge of the ſubſtances, in reſpect to their original matter and compoſition, inſtead of affording any ſufficient lights whereby to enable us to

to determine with certainty of them, would only lead us to draw very erroneous concluſions. Though the form, grain, colour, hardneſs, poſition, and external appearances may aſſiſt us in our conjectures of the true nature of minerals, and ſometimes of the manner in which they are produced, yet we muſt nevertheleſs remain in uncertainty till proper experiments guide us to a more clear deciſion.

Forgive me for mentioning the concluſions, which, in my opinion, might be drawn from your obſervations, regarding the internal nature of theſe ſubſtances, ſo far as I have been able to diſcover them from actual experiments. But you muſt by no means expect a ſolution of all the difficulties that ariſe on this intricate buſineſs. I will cautiouſly endeavour to ſeparate what is certain, from what has been hitherto conſidered precarious and doubtful; a due regard to truth will always prevent me from offering mere conjectures, or even credible opinions, with a peremptory de-

ciſion, as incontrovertible arguments. Experience has taught us that we ought to judge of the works of nature with the utmoſt diffidence; and we do not want examples, even from the remoteſt times, of perſons who have pretended to explain, with the moſt poſitive certainty, not only how our earth, but even how the whole world received its preſent form, and even its very origin. To determine the contrivance of ſo vaſt a machine over a writing-deſk is, indeed, one of the moſt daring enterprizes which the proud reaſon of man ever propoſed to itſelf; and, more than any other attempt, ſhews his weakneſs and arrogance. All theſe imaginary ſyſtems have been by little and little overturned, though the greateſt pains were exerted to compare them with nature, and examine their exiſtence. Their arguments were then diſcovered to be founded on a few inſufficient obſervations, or, what is ſtill worſe, on uncertain, and ſometimes evidently falſe principles.

You,

You, Sir, will therefore readily excuſe my timidity; for inſtead of endeavouring to diſcover all at once, as it were à priori, though without any certainty, the manner in which nature works, and forms things in ſecret, I prefer the more laborious method of diſcovering it gradually with certainty, by experiments founded on due obſervations; and ſhall not heſitate to confeſs my ignorance, whereever theſe guides in the ſtudy of nature ceaſe their inſtructions. I do not, however, reject all conjectures and propoſed opinions, whenever they lead to new reſearches, provided they are offered as mere conjectures, and not obtruded on us as certain truths, or determined opinions.

From what I have hitherto ſaid, you will, I believe, conceive my method: therefore I ſhall enter upon the ſubject, and briefly treat of it under ſeparate heads, in the following manner.

Of the Hot Springs.

YOUR deſcription of the Icelandic ſprings, the moſt extraordinary which have hitherto been diſcovered in the known world, was extremely agreeable to me, partly on account of the ſurprizing force of them, and partly on account of the great light obtained in mineralogy by the cruſtated ſtones formed in them. How theſe ſprings may be accounted for, I hope I have ſufficiently explained in another place *; I ſhall, therefore, entirely paſs it over here. But now I will communicate to you what I could not then underſtand, namely, the true nature of theſe depoſitions.

You have preſented me with the following ſubſtances from the Geyſer:

1. The ſubſtance of which the water has prepared itſelf a baſon to run from.—It conſiſts of a hard, rough, greyiſh, and irregular ſlaty, and generally martial cruſtated ſtone, over which a covering of ſmall cryſtalli-

* In my Phyſika beſkriſning om Jordlotet, ult. edit.

zations

zations has formed itſelf, that reſembles the lichen fruticuloſus, or rather the Stahlſtein druſe found in the Weſterſilverberg; that is commonly called the Flos ferri, or Eiſen bluthe. Theſe precipitations are opaque without, of a whitiſh grey, blacker within, and plainly ſhew the formation of ſeveral cruſts on one another. Theſe, as well as the cruſtated ſtone, have the hardneſs of a flint; however they are not ſo compact or ſtrong as to ſtrike fire with the ſteel.

The ſtrongeſt acids, the fluor acid not excepted, are not ſufficient with a boiling heat to diſſolve this ſubſtance. It diſſolves very little, if at all, by the blow-pipe with the fuſible alcali, a little more with borax, and makes a ſtrong efferveſcence with ſal ſodæ. Theſe effects are peculiar only to a ſiliceous earth, and therefore there remains no doubt concerning the real nature of this cruſtated ſtone. Nevertheleſs I have melted it in the crucible; firſt, by weight, with half as much alcaline ſalt, and likewiſe with three times as much;

and have obtained in the firſt caſe a fixed glaſs, and in the ſecond one, which, in diſſolving, yielded a common liquor ſilicum. The glaſs of the cruſtated ſtone is of a more yellowiſh brown than that of the cryſtallizations; and this difference is cauſed by the greater quantity of irony particles.

2. The porous cruſtated ſtone or ſinter, which is found in the moor ſurrounding the border of the baſon, is light, whitiſh, and here and there ſpotted with a ruſt colour: it is evidently an incruſtation upon moſs and ſimilar ſubſtances, that have decayed by length of time, and left thoſe cavities. In regard to its compoſition, it is of a ſiliceous a nature as the preceding, and alſo perfectly ſimilar in reſpect to fire and diſſolvents.

I have already mentioned the ſolution of the flint in ſal ſodæ with the blow-pipe; and as I ſhall hereafter have frequent occaſion to refer to it, I will in this place relate the whole proceſs. The late director of the mines (*bergmaſtare*) Mr. Cronſtedt makes mention of this

ſalt

ſalt in his Mineralogy, but it is very ſeldom; and he conſiders it as leſs proper for uſing with the blow-pipe, becauſe it is too ſoon imbibed by the coals. It certainly does not afford a very good ſolution upon coals, and I therefore made uſe of a ſilver ſpoon made on purpoſe; by which method I have been able to make good uſe of the ſal ſodæ, which in his examinations of the different kinds of earth in this manner, is very ſerviceable, and even indiſpenſably neceſſary, as I ſhall hereafter prove more at large, in a little diſſertation on the blow-pipe, and its proper uſe.

I have frequently inſerted a ſuppoſition in my printed works, that though the ſiliceous earth cannot be diſſolved in the uſual manner in water, yet it might with the help of a great degree of heat; and that this really happened at the Geyſer, is evidently proved by the above deſcribed cruſtated ſtone. The hot water forms of itſelf the large ſiliceous baſon from which it iſſues out of the ſubſtance, that is in a diſſolved

diſſolved ſtate at the firſt, but quickly precipitates on account of the heat decreaſing in the open air. The heat of the water was not examined with the thermometer, till ſuch time that the baſon was filled, when it was nevertheleſs found at a hundred degrees, according to the Swediſh meaſure. It is in all probability much greater under the earth; for its running through cooler channels, and its ſpouting afterwards into the air to a great height, muſt neceſſarily very much diminiſh the heat on account of the great diſperſion.

This quick depoſition produces both the opacity and irregular form of this ſtone, and prevents the particles from being ſo cloſely united as might have been expected from the degree of the hardneſs of each, ſuppoſing the ſolvent power had diminiſhed more gradually.

Mr. Scheele has diſcovered the formation of the flint; and I myſelf have found out, within theſe two years, a method of obtaining, with the help of

of ſome fluor acid, thirteen precipitated cryſtals of the ſize of ſmall peas. This artificial pebble in all experiments, both in the wet and dry method, and even in the focus of a burning-glaſs, in a piece that I ſent to Mr. Macquer, diſcovered exactly to him the ſame qualities as the natural one.

All theſe circumſtances, therefore, prove, that the pebble is a ſaline earth, which is compoſed of fluor acid, and an original ſubſtance exiſting in the watry exhalations. It is not quite ſimple; but however, I have not been able to conſider it as any other than an elementary earth: indeed my judgment is, that it cannot be compounded from any other principle.

I do not in this place mean a finer or coarſer powder, by the denomination of earth, as is generally underſtood under this appellation; but I take the word in a chemical ſenſe, to expreſs a fixed principle, which is obtained in analyſing any ſubſtance, and that cannot be diſſolved in boil-

ing water, after the niceſt mechanical diviſion. It is well known that the diſſolubility of any ſubſtance may be leſſened by certain compoſitions; and that a ſolvent can better attack the ſubſtance, according to the extent of its ſurface; and laſtly, that water in an open veſſel will not admit of any greater degree of heat than one hundred degrees, according to the Swediſh thermometer. A ſubſtance may, by this rule, be diſſoluble by itſelf, after having gone through a preparatory cleanſing, or a chemical ſeparation, or with the aſſiſtance of a greater degree of heat, though it might be indiſſoluble without any preparation, or with the uſual method of boiling; and it is with a view to this circumſtance that I call the flint a kind of ſalt earth.

I have likewiſe examined the ſubſtances you collected in the moraſs near the Geyſer, and have found them to be the following:

3. A dark-red bole, which became darker in the fire, but was afterwards a little attracted by the magnet. It crum-

crumbles into pieces in the water, and is fine and tough to the touch.

4. A bluiſh-grey clay, which contains green vitriol of decayed pyritæ.

5. A brighter grey ſort, which did not ſeem to contain any vitriol.

6. A white or yellowiſh clay, with ruſt-ſpots.

All theſe ſorts become very hard in the fire, and take a good deal of time before they liquefy. The laſt, when it ſoftens, is more harſh and ſandy to the touch than the preceding ſorts.

The different ſorts of ſtone collected at Laugarnas are of another nature: nor does the water here ſpout out of a baſon, but through many ſmall openings in the earth.

7. A whitiſh irregular plated cruſt, which often grows on the outſide into ſmall globular blunt points. This in acids gives a ſudden fermentation, that immediately ceaſes without its being any otherwiſe attacked. It diſſolves with borax by the blow-pipe with great difficulty, and without motion, but with a loud effervescence with

with ſal ſodæ. It is conſequently a ſiliceous maſs outwardly covered with lime, and has fixed itſelf on the following ſubſtance.

8. A ſolid irregular plated and broken cruſt, of a dark colour, but in many places tinged with bright blue ſpots. It becomes quite ſmooth in cutting, almoſt like ſtone marle, but does not crumble in water, nor does it become ſoft in it; with acid it ſhews an effervescence which ſoon ceaſes; with the blow-pipe it grows hard, ſcarcely melts at the thinneſt edges, and is attacked with ſome motion both by borax and fuſible urinous ſalt and ſal ſodæ, but is not entirely diſſolved by any of them.

9. The ſubſtance found at the bottom of the brook, which carries off the water that guſhes out, is brown, ſpongy, and compoſed of pretty hard flakes and threads, that are covered with fine glaſſy cryſtallizations. Theſe are clear only in ſome few places; but loſe their brown colour, both in fire and marine acid, and become quite clear.

The

The ſmall cryſtals puff up very much under the blow-pipe, almoſt like borax; they float in bubbles on the ſurface, and are diſſolved with great difficulty by borax; they are attacked by ſal ſodæ with a ſtrong ebullition: it is the ſame with the more ſolid flakes, but they do not puff up ſo ſtrongly as the cryſtallization. Theſe ſeveral qualities here mentioned evidently ſhew, that this cruſtated ſtone conſiſts of zeolite.

10. From Reykum you ſent me calcareous ſpar in lumps, that are externally rounded, as if they had been toſſed backwards and forwards by the water, and rubbed againſt hard bodies. In them there are ſmall greyiſh green cryſtallizations, that diſſolve by the blow-pipe to a black ſlag; the ſal ſodæ makes them effervеſce a little, but does not diſſolve them; they are likewiſe attacked with ſome emotion by fuſible urinous ſalt.

11. A looſe, tubuloſe, whitiſh cruſtated ſtone, or cavernous incruſtation, and with impreſſions of leaves, ſtalks,

ſtalks, and the like. As to its nature, it is ſiliceous; but ſeems at the ſame time to contain a different ſubſtance, as it diſſolves more ſlowly with ſal ſodæ.

The ſpring which here burſts forth in a very ſloping direction towards the horizon, according to your account, depoſites a kind of ſulphureous greaſe by its hot ſteam on the cavities of the upper ſide; but I have found no ſpecimen of this in the collection you ſent me.

From what I have hitherto ſaid, we may gather, that the Icelandic hot ſprings contain very different ſubſtances from what are to be met with in other places of the ſame ſort, eſpecially ſiliceous earth.

There is no lime at all near the Geyſer; but at Laugarnas there are ſome faint traces of it, partly as an external covering, and partly as conſtituent parts in the zeolite, of which more will be ſaid hereafter. The balls of lime found at Reykum are moſt probably thrown out by the ſpring,

ſpring, and have been rounded on the ſurface by the friction.

Of the Eruptions of Fire.

I HAVE in another * place treated pretty extenſively of the dreadful devaſtations cauſed by ſubterraneous fires on the ſurface of the earth in many parts of the world, both in regard to their cauſes and effects; I have therefore not any thing to add in this place but what particularly relates to Iceland, and what may ſerve to explain the eruptions that have happened there from time to time.

Whether Iceland is to be conſidered as entirely produced by volcanos, is a queſtion that moſt probably will remain unreſolved many years. It is true, Sir, that according to the accounts you have collected there, the volcanos have raged in a great many places, and that the whole country is in a manner covered with traces of their deſtructive

* Verlds beſkrifn, § 149.

effects: we alſo learn from undeniable facts, that new iſlands have been produced by volcanos in many places. But all this proves not any thing more than that the moſt dreadful effects have been produced by fiery eruptions in Iceland.

To determine this queſtion, it would be indiſpenſably neceſſary that a naturaliſt ſhould thoroughly examine all Iceland. If a granite, or any other ſtone or berg-art, was found in ſolid rocks, and not ſeparate or in looſe fragments, which may have been brought thither from diſtant parts, I ſhould entirely diſſent from your opinion. But before theſe and the like diſcoveries were made, I believe no concluſions could be drawn.

I may venture to maintain with more certainty, that your collection confirms what I before concluded from other reaſons, viz. that in all volcanos pyrites are found, which on decompoſing produce heat and fire; and likewiſe ſlate that, penetrated with bitumen, ſerves to feed the fire.

12. The ſlate which you have brought from Iceland ſplits into thin plates, that diſcover many ſorts of impreſſions, particularly of leaves; the colour is black, and it is exactly of the ſame nature as the common aluminous ſlate.

13. The two pieces of ſurturbrand, or foſſil wood, which you brought with you, bear evident marks of a vegetable compoſition; and I may almoſt affirm, with perfect certainty, that the largeſt is a kind of pinus abies; on the outſide are barks and branches, and in the inſide all the rings of the ſap appear: the leſſer is a piece of rind without wood; both are black, quite ſoft, eaſily take fire, and flame in burning. After the flame is extinguiſhed, one hundred parts afford forty-two parts of coals, which after being only calcined yield two parts of yellowiſh-brown earth, that is attracted by the magnet, and partly diſſolves with acids: it makes ſome effervescence with borax and ſuſible urinous ſalt; the ſal ſodæ alſo

cauſes a little ebullition at firſt, but does not entirely diſſolve it.

Your conjecture, Sir, concerning the manner in which the ſurturbrand is produced, does not ſeem improbable. I have already obſerved a long time with ſurprize, that fiſhes, orthoceratites, lituites, wood, &c. &c. which are to be found in ſlate, have been compreſſed or flatted, whilſt they preſerve their entire form and roundneſs in lime-ſtone.

This ſame circumſtance may be obſerved in the two pieces deſcribed above, eſpecially in the larger, which is only an inch and a half in thickneſs, though it is nineteen inches in length, and thirteen in breadth. The outſide of it has no marks of any roundneſs, but is quite flat. An exceeding great weight is required to preſs a ſtick to a flat plate; and I cannot conceive how the moſt immenſe beds, which muſt neceſſarily have been ſoft when ſpread over it, could ever produce this effect. The cauſe of this is yet undiſcovered, and will probably remain ſo a long

a long time; however ſomething may be found there which ſeems to ſhew, that the bituminous ſlate has been produced in the ſame manner, as it has not only penetrated the ſubſtance of the ſlate, but every thing elſe which has been laid upon it, for it may yet be obtained by means of diſtillation. But by what means has this been brought thither? How could it be imbibed by the clay, in caſe this was under water, which however ſeems to be undeniable, from the prodigious number of marine animals that are found buried in it? and how could the incloſed bodies have been preſſed down horizontally? All theſe problems I cannot as yet anſwer ſatisfactorily, much leſs explain with any degree of certainty.

14. Very coarſe, heavy, and hard lava, full of bladders, almoſt black, intermixed with white grains reſembling quarz, which in ſome places have a figure not unlike a ſquare.

The black matter is not attracted by the magnet; but if a piece of it is

held againſt a compaſs, the needle viſibly moves. When tried in the crucible, it yields from nine to ten pounds of iron in every hundred weight: it does not diſſolve in the leaſt with ſal ſodæ, with great difficulty with borax, and ſcarce viſibly by fuſible urinous ſalt. It ſeems to contain a great deal of clay earth in its compoſition, which may be extracted by all acid ſolvents.

It is well known that this earth, when it is entirely free from any other mixture, may, by means of heat and drying, be brought to that degree of hardneſs, as to give fire with a ſteel, which proceeds from the parts being brought cloſer together, and contracted in a ſpace only half as large. By being thus contracted, it obtains a ſolidity and hardneſs; and beſides, the ſurface is ſo much diminiſhed, in proportion to the whole maſs, that the water cannot penetrate any farther to ſoften it.

We have almoſt daily opportunities in the ſtudy of chemiſtry of convinc-

ing

ing ourſelves, that a ſubſtance with a ſmall ſurface cannot be changed in any manner by liquid ſolvents ; but may however be attacked by them, in proportion to the different degrees of pulverization ; nay, even a ſubſtance that cannot be reduced by the fineſt mechanical diviſion, may frequently be ſeparated, as much as is neceſſary, by a chemical one ; that is to ſay, by a preceding ſolution in another ſolvent. The attraction is here in proportion to the extent of the ſurface ; and the larger this is, the ſtronger will be the attack : conſequently I cannot believe that any clay, petrified by heat or ſlow drying, can have undergone any eſſential change, but only that its parts have ſo contracted themſelves as to give it the hardneſs of a flint and prevent it from imbibing any viſible quantity of water. But as ſoon as it has been diſſolved by any acid whatever, and its parts have by this means been brought out of its former contraction, to the requiſite degree of fineneſs and expanſion, it becomes as ſoft as before, without the

acid contributing any more to it than has been ſaid, as all kinds of acids ſucceed equally well.

I have a very good aſſortment of the lava of Solfatera, by which it is very evident that the ſulphureous acid, which had penetrated the black lava, deprived it gradually, partly of its combuſtible quality, and had alſo whitened it (to effect which other ſubſtances, particularly ſilk, are likewiſe expoſed to ſulphureous exhalations) and partly had reduced it by ſolution, either to a perfect allum, or at leaſt to the common nature of any looſe clay. I have likewiſe produced all theſe effects with aqua-fortis, or any other acid, in a lava which had not yet ſuffered any change.

The white, that poſſeſſes more or leſs of thoſe tranſparent grains or rays with which the lava is chequered, do not ſeem to be of the nature of quarz, as they cannot be attacked by ſal ſodæ; they are, however, with ſome difficulty diſſolved by borax and fuſible urinous ſalt.

Theſe effects are perfectly ſimilar to thoſe produced upon the diamond, ruby, ſaphire, topaz, and hyacinth. The cryſolite, garnet, turmaline, and ſpirl, can neither be diſſolved by ſal ſodæ, though they are ſomewhat attacked by it, when reduced to a fine powder; and upon the two laſt mentioned ones it produces a ſlight effervescence. On this account it is poſſible that the precious ſtones of mount Veſuvius, that are ſold at Naples, are more near related to the real precious ſtones than is generally imagined.

15. A finer kind of lava, quite porous within, and entirely burnt out, and conſiderably lighter on that account than the preceding one. I have not found any ſuch grains in it reſembling quarz.

16. The ſo called Icelandic agate. This is of a black or blackiſh-brown colour, and a little tranſparent at the thin edges like glaſs, and gives fire with the ſteel.

It cannot eaſily be melted by itſelf, but becomes white, and flies in pieces. It can hardly be diſſolved in the

the fire by fuſible urinous ſalt; but it ſucceeds a little better with borax, though with ſome difficulty; with ſal ſodæ it diſſolves very little, though in the firſt moments ſome ebullition is perceived, and the whole maſs is afterwards reduced to powder.

From hence it may be concluded, that the Icelandic agate has been produced by an exceſſive fire out of the lava deſcribed in N° 14. I have found no cryſtals of this glaſs in the collection. If any perſons have ſuch in their poſſeſſion, they ſhould be examined to ſee if they are exactly of the ſame nature and ſubſtance with the above deſcribed agate, and if their form has not been produced accidentally by burſting aſunder.

17. More or leſs light, ſpongy, and burnt-out pumice-ſtone, particularly black and reddiſh brown. Quarz cryſtals are ſometimes found in them; but often the rays and grains reſembling quarz mentioned in N° 14.

18. Stones thrown out of the volcano, grey or burnt brown, which ſeem to conſiſt of a hardened clay mixed with

with ſiliceous earth. They are ſprinkled with rays and grains reſembling quarz, and ſome few flakes of mica. They fuſe with great difficulty in the fire; with ſal ſodæ they ſhew ſome efferveſcence at firſt, but however it ſoon ceaſes: the parts reſembling quarz do not produce any motion at all. From this we may conclude, that the lava mentioned in N° 14, principally originates from this ſubſtance.

The other looſe ſtones which I have received from you, Sir, to all appearance have no abſolute connection with the eruptions of fire, though ſome have been ſuſpected of it. I will enumerate them here ſeparately.

19. Red and green jaſper, which, in ſome places where it is broken, is quite ſmooth and ſhining; this circumſtance diſtinguiſhes it from the common jaſper, which is dull and clay-like where it is broken. It has beſides all the qualities of true jaſper; ſtrikes fire with the ſteel, does not melt in the moſt violent fire, but is diſſolved by ſal ſodæ with an efferveſcence, &c. &c. As to the

ſmooth-

ſmoothneſs of ſome parts, it cannot proceed from a commencing fuſion, as it becomes black and dark in a weaker fire. We here only find a new link in the connected chain of nature, by which the jaſper is united with the flint.

There is no black jaſper in your collection ; but the pieces, which to appearance come neareſt to it, belong to the claſs of the trapp, and ſhall be deſcribed hereafter.

20. Grey, greeniſh ſlate, reſembling jaſper, that gives ſparks with the ſteel, is attacked with a quick efferveſcence by ſal ſodæ, but not farther diſſolved by it. In ſome places are grains reſembling quarz, which are eaſily diſſolved in fuſible urinous ſalt, but do not ſhew the leaſt efferveſcence in ſal ſodæ.

21. The ſmall cryſtals, ſaid to reſemble cocks-combs; they are nothing but a different appearance or change of the heavy ſpar.

22. A chalcedon cruſt with ſmooth prominencies, like what they call the hæmatites : this is diſſolved with the utmoſt

moſt difficulty by fuſible urinous ſalt, with more eaſe by borax, and with a violent efferveſcence by ſal ſodæ, exactly as the flint.

23. Zeolite; two kinds: the one is ſolid, white, and internally, as it were, compoſed of globoſe parts, in which rays proceeding from the center appear that reſemble fine threads.

This ſort ſwells a little by the blow-pipe, diſſolves perfectly with borax, ſeparates in ſal ſodæ with ſome efferveſcence, but ſoon ceaſes, and leaves ſome part undiſſolved.

The other ſort conſiſts of a plate, that, in colour and break, reſembles a carnelian: it has a quantity of ſmall prominencies in it, filled with irregular white cryſtals, and ſome of the cavities are filled with a looſe-grained and browniſh-red ſubſtance.

The ſubſtance reſembling a carnelian becomes white in the fire, bubbles up, and becomes fuſible.

The cryſtalline ſubſtance becomes more frothy in the fire than the carnelian, and has all the qualities of the zeolite.

The

The ſandy ſubſtance hardly ſwells ; is diſſolved with difficulty by borax, and is attacked at firſt with a ſudden efferveſcence by ſal ſodæ.

As it is not uncommon, even in the profeſſors of morality, to paſs from one wrong ſtep to another, ſo are we not without examples of this kind in thoſe who make nature their ſtudy. Ten years ago it was a general opinion that the ſurface of the earth, together with the mountains upon it, had been produced by moiſture. It is true, ſome declared the fire to be the firſt original cauſe, but the greater number paid little attention to this opinion. Now, on the contrary, that a ſubterraneous fire had been the principal agent gains ground daily: every thing is ſuppoſed to have been melted even to the granite. My own ſentiments with regard to it is this, that both the fire and water have contributed their ſhare in this operation, though in ſuch a proportion, that the force of the former extends much further than the latter : and, on the

the contrary, that the fire has only worked in ſome parts of the ſurface of the earth.

It is not an eaſy matter to explain how the granite, which conſiſts of clear quarz-cryſtals, ſolid field-ſpar, and glimmer (*mica*) with flat ſcales, has been able to ſupport a fuſion without the quarz burſting, or becoming opaque.

This is yet leſs to be conceived of the field-ſpar, that becomes ſoft and liquid in a weak fire, and has a dull appearance. The glimmer ſplits its ſcales aſunder in the fire, and frequently twiſts them together again in a very different manner from that in which they appear in the granite. Notwithſtanding all this, if the granite is conſidered as a production of the fire, it need not be wondered at, that the zeolite has likewiſe been comprehended in this ſuppoſition.

I will allow that cryſtals may be produced by the dry method, and I know ſeveral ways of obtaining them, both by fuſion and ſublimation; but I can never be perſuaded that the zeolite

has been produced by the aſſiſtance of fire. It is true, that ſometimes they are found in ſtones, and in ſuch places where volcanos had formerly raged; but it is likewiſe found in ſolid rocks that have never been expoſed to theſe fires, as at Guſtavenberg in Jemtland.

If more ſorts than one are alſo certainly free from all ſuſpicion of having been ſubject to fuſion, how is it poſſible, without the cleareſt proofs, to ſuppoſe that the whole genus has been ſubject to it? If the Icelandic zeolite has been produced by fire, we may juſtly queſtion how it can yield above five quarts in twenty-five of water in diſtilling. This may likewiſe be applied to all the other ſorts, though they generally contain leſs water, and the red ſort from Adelfors only one quart in twenty-five. This is evidently the water of cryſtallization, in proportion to which each kind ſwells more or leſs by the blow-pipe. The Icelandic and Feroe zeolites are moſt ſubject to this, almoſt like borax; the Adelfors zeolite ſwells much leſs, and that from

from Upland, and ſeveral other ſorts, ſo little, that it ceaſes in a moment; and even then produces ſo ſmall an expanſion of ſpace, that it is ſcarcely perceivable to the eye.

Since therefore all zeolites contain this water of cryſtallization, which is neither found nor expected in the productions of fire, it ſeems to me to be undeniable, that they have been produced in the way of moiſture; beſides, the zeolites do not conſiſt of a ſimple particular kind of earth, but of three different ſorts that are mixed together, and in a manner the one diſſolved by the other, in conſequence of which their connection cannot be conſidered as an original earth. In all, the greateſt part conſiſts of ſiliceous earth, the next is argillaceous earth, and the leaſt part is calcareous earth. The two laſt ſorts may be diſſolved by acids, and then precipitated by alkali volatile cauſticum, by which the argillaceous earth, but not the calcareous earth, after being ſeparated from the firſt by filtrating, may be precipitated by ſal ſodæ.

In this manner I have found that the white zeolite deſcribed above, contains 48 in 100 of ſiliceous earth, 22 of pure argillaceous earth, and from 12 to 14 of calcareous earth. If theſe numbers are added together, and reckoned with what it contains of water, the produce is ſomething more than 100. This ſurplus proceeds from the calcareous earth that enters into the zeolite without fixed air, with which it is afterwards impregnated during the precipitation. Other zeolites contain exactly the ſame ſubſtances, only in different proportions.

Of thoſe which I have hitherto examined, the Jemtland zeolite contains the greateſt quantity of calcareous earth, that is to ſay, 16 parts in 100, and that from Feroe the leaſt, namely, 8 in 100. The red zeolite from Adelfors contains the greateſt quantity of ſiliceous earth, to wit, 80 in 100, and the Icelandic the leaſt, to wit, 48 in 100. The zeolite from Feroe contains moſt argillaceous earth, namely, about 25 in 100, and that from Adelfors the leaſt, or about 9 in 100.

When the original compoſition of any kind of ſtone is thus known, it is not difficult to determine its qualities.

The zeolites at firſt froth and ſwell in the fire, the cauſe of which has been already explained.

They afterwards fuſe more or leſs perfectly. The ſwapparara kind may be reduced to a clear glaſs, and the Upland red zeolite can hardly be brought to give any ſigns of vitrification on the ſurface.

It is well known that quarz, pure argillaceous earth, and lime cannot ſeparately be made to fuſe, nor two and two mixed together in many caſes; but when all three are compounded, they are more or leſs inclined to fuſion. One part of pure argillaceous earth, with one part of lime, and two and a half to three parts of quarz, afford a mixture which is eaſieſt brought to fuſe. If the compoſition of the zeolites is compared with this mixture, they are found to be fuſible in the ſame meaſure as the proportion of their conſtituent parts approaches more or leſs to the abovementioned compoſition.

They are more ſtrongly attacked by ſal ſodæ than by borax, or fuſible urinous ſalt, becauſe there is moſt ſiliceous earth in all, which is beſt diſſolved by the ſolid alkaline ſalt in the dry way.

Laſtly, ſeveral ſorts have the quality of yielding jellies, that is to ſay, they change a proportionable quantity of acid to a ſemi-tranſparent congealed maſs, which reſembles a jelly.

Theſe congelations may in general be produced in different ways; ſometimes the menſtruum by length of time loſes its power, when the diſſolved part is attacked gradually, though imperfectly, ſo that in a manner it remains ſuſpended half diſſolved, and after ſome evaporation at laſt congeals to a tough coherent ſubſtance. This frequently happened in diſſolving tin in marine acid, or aqua-regia, when the inflammable ſubſtance decreaſes too much, and by that means weakens the connection between the metal and the ſolvent.

Sometimes a kind of gelatinous congelation is produced by an imperfect precipitation. For inſtance, when

when the liquor ſilicum is united with a certain quantity of acid, ſo that the ſiliceous earth is not entirely ſeparated, but remains ſuſpended in the liquor. This much reſembles a circumſtance exhibited by ſome zeolites, which I will now more fully explain.

As the red zeolite of Adelfors produces this effect more clearly than any other, it ſhall ſerve as an inſtance of it. After this is ſeparated and freed as much as poſſible from calcareous ſpar, three or four tea ſpoons full of it muſt be thrown into a wine glaſs half filled with common aqua-fortis, when after a ſhort time the whole ſolution will be found in the form of a reddiſh gelatinous ſubſtance, that nothing of it runs out if even the glaſs is turned. To diſcover the cauſe of this, I have taken ſome of the cleareſt jelly, and diſſolved it with boiling water in a glaſs mortar, and left it to dry on a filtering paper after a perfect filtration, by which means the place that it occupied was incredibly diminiſhed. I then tried this ſubſtance with acids, but it was not at all at-

tacked, and did not melt in the ſtrongeſt fire alone. The fuſible urinous ſalt hardly attacked it; borax diſſolved it, though with difficulty; but ſal ſodæ diſſolved it perfectly with a ſtrong efferveſcence. In conſequence of this the gelatinous ſubſtance chiefly conſiſts of ſiliceous earth expanded in the higheſt degree. But by what means has this indiſſoluble ſubſtance been introduced into a ſolvent?

We have before obſerved, that the Adelfors zeolite contains eighty parts in a hundred of ſiliceous earth, nine and a half of argillaceous earth, and ſix and a half of calcareous earth free from fixed air; all which ſubſtances are united as cloſe as poſſible. If therefore the powder is thrown into an acid, and remains there during ſome time, the argillaceous and calcareous earths are immediately attacked by it; but theſe are internally connected with the ſiliceous earth, and conſequently take a conſiderable part of it, half diſſolved, into the ſpungy and ſwoln ſtate, which all ſubſtances generally exhibit in the moment of precipita-

precipitation. The ſame thing happens when a reſinous gum is laid into ſpirits of wine; part of the gum, together with the reſin, is then immediately diſſolved by the ſpirit of wine on account of its connection, though the firſt alone cannot be diſſolved by it at all. If a ſufficient quantity of water or acid is added before the liquor begins to congeal, no congelation enſues, but the ſiliceous earth falls in looſe flakes to the bottom, which evidently proves that the ſolvent, in regard to its quantity and ſtrength, muſt be confined within certain limits. An addition of ſome chalk increaſes its tendency to gelatinous congelations, partly becauſe the ſolution becomes more broken and hard, and partly by means of bubbles of fixed air, which attach themſelves to the ſpungy ſiliceous powder, and make it lighter; whence the zeolite of Adelfors in this caſe ſeems to have an advantage over every other ſort, on account of the lime-ſpar naturally mixed with it; the principal part however, no doubt, depends on the

ſeveral parts that compoſe it. Some ſorts afford only a gelatinous ſubſtance after a preparatory calcination; the cauſe of which moſt probably is this, that the calcareous earth has not before been enough united with the ſiliceous earth, at leaſt not with the whole of it. It is well known that lime and quarz, when expoſed to the operation of a fire, that has only cauſed them to bake together, neverthelefs afterwards yield a gelatinous ſubſtance. Alcaline ſalt mixed with ſand affords a ſimilar demi-concretion, as when we calcine pot-aſhes; on which account the cleareſt ſolution a long while after precipitates ſiliceous powder, in the ſame proportion that the alcaline ſalt attracts fixed air, with which it preferably unites itſelf. This generally produces a gelatinous congelation, when the water is ſaturated with alcaline ſalt, and alſo is well charged with ſiliceous earth.

From the ſame cauſe, clay, ſpathoſe fluor, and other ſubſtances, hard to be diſſolved in acids, may be brought to a gelatinous congelation, when they have

have before by fuſion been united with alcaline ſalt, borax, or calcareous earth: calcareous earth by itſelf never gives a gelatinous ſubſtance in acids, conſequently it can ſo much the leſs become a ſiliceous earth by this method, as has however been thought by ſome, who would ſoon relinquiſh their opinion, if they would only make experiments themſelves; where there is no flint before, it cannot poſſibly be produced by any other acid, but that which is obtained from ſpathoſe fluor.

But at preſent this is enough of the zeolite, of which I have treated more extenſively, as it is found in great abundance in Iceland, and is ſuppoſed by ſome to be produced in the dry way; but I hope that this matter is at preſent entirely determined, not only by its ſeparation, but alſo by its production, which happens daily in the water. See N° 2.

I have for ſeveral years paſt endeavoured to diſcover the number as well as the nature of the original kinds of earth. In the year 1758 Mr. Cronſtedt counted nine; if he had lived longer

longer for the benefit of the ſciences, he would no doubt have rectified this account. In conſequence of my experiments I have diſcovered the following ſix ſorts:

1. Calcareous earth, which after being ſaturated by acid of vitriol affords a gypſum.

2. Terra ponderoſa, which with acid of vitriol gives a ponderous ſpar, and in ſeveral reſpects is very different from the calcareous earth.

3. Magneſia, which, together with acid of vitriol, produces the Engliſh or Epſom ſalt.

Theſe three kinds are generally found ſaturated with fixed air, and they are on that account ſubject to an effervescence with ſtronger acids.

4. Argillaceous earth, which, together with the vitriolic acid, produces allum.

The common argillaceous earth is always mixed with ſiliceous earth, but the ſort here meant muſt be entirely pure.

5. Siliceous earth, which is not attacked by any acid yet known, the fluor

fluor acid excepted. In the dry way it can be diſſolved with a third part of its weight of fixed alkali to a tranſparent laſting glaſs, which at firſt is affected with a ſtrong effervеſcence.

6. Gemmeous earth, that is not attacked by any known acid, and clearly diſtinguiſhes itſelf from the preceding ſorts, by its being entirely indiſſoluble, and is not ſubject to any effervеſcence in the fire with fixed alcali. It is found in all the gems or precious ſtones.

I have in vain made uſe of various methods to ſeparate theſe earths into more ſimple principles, and to all appearance others would have no better ſucceſs than I have had; if they are really compounds, they are at leaſt ſimple in regard to the method known among us of ſeparating ſubſtances, and do not ariſe from one another. Whatever has therefore been objected to this opinion from prejudice, cannot ſubſiſt after experiments have been made upon that ſubject. We muſt not pretend to improve nature according to our notions,

but

but endeavour to diſtinguiſh all kinds of ſubſtances, which have ſufficient and laſting marks of diſtinctions. No certain origin can be made unleſs the ſeparation and compoſition of them, which may be relied on, has been made before. All the different ſorts of ſtone and earth, hitherto known, are compoſed of one or more of the ſix principles before-mentioned, which ſhall be proved more at large in another place, as ſoon as I am able to make ſome experiments that require repetition.

Of the Baſalts.

OF all the mountains hitherto known, there are without doubt not any more remarkable than thoſe that are compoſed of angular pillars. A few years ago only one or two of this kind were known; but new ones are daily diſcovered, which is a plain proof how much our attention requires being rouzed to prevent

prevent it from ſlumbering, on the moſt important occaſions.

It cannot be much doubted that there has been ſome connections between theſe pillars, and the effects of a ſubterraneous fire, as they are found in places where the ſigns of fire are yet viſible; and as they are even found mixed with lava, tuff, and other ſubſtances produced by fire.

The cauſe of the regular form of theſe pillars is a problem which we have hitherto been unable to ſolve ſatisfactorily. This difficulty has appeared ſo inſurmountable to ſome, that they have thought it impoſſible to be the effects of nature, and have conſidered them as works made by human hands: this idea betrays the utmoſt ignorance in regard to the true nature of theſe mountains of pillars, and does not even deſerve a refutation.

As far as we know, nature makes uſe of three methods to produce regular forms in the mineral kingdom, namely, that of cryſtallization or precipitation: 2dly, the cruſting or ſettling of the external ſurface of a liquid

liquid maſs whilſt it is cooling: and, 3dly, the burſting of a moiſt ſubſtance whilſt it is drying.

The firſt method is the moſt common, but to all appearance nature has not made uſe of this in the preſent caſe. Cryſtals are ſeldom or never found in any conſiderable quantity running in the ſame direction, but either inclining from one another, or, what is ſtill more common, placed towards one another in ſeveral ſloping directions. They are alſo generally ſeparated a little from one another, when they are regular; the nature of the thing likewiſe requires this; becauſe the ſeveral particles, of which the cryſtals are compoſed, muſt have the liberty of following that power which affects their regular diſpoſition.

The baſalt columns, on the contrary, whoſe height are frequently from thirty to forty feet, are placed parallel to one another in conſiderable numbers, and ſo cloſe together that the point of a knife can hardly be introduced between them. Beſides, in moſt places, each pillar is divided into ſeveral parts

parts or joints, that ſeem to be placed upon one another; and indeed it is not uncommon for cryſtals to be formed above one another in different layers, when the ſolvent has been viſibly diminiſhed at different times; but then the upper cryſtals never fit ſo exactly upon the lower ones as to produce connected priſms of the ſame length and depth as all the ſtrata taken together, but each ſtratum ſeparately forms its own cryſtals.

How then can the Giant's Cauſeway, in the county of Antrim, Fingal's Cave at Staffa, and all other aſſemblages of pillars of the ſame kind, be conſidered as cryſtallizations? Precipitation, both in the wet and dry manner, requires that the particles ſhould be free enough to fix themſelves in a certain order; and as this is not practicable in a large melted maſs, no cryſtallizations appear in it, except on its ſurface, or in its cavities.

Add to this, that the baſalts in a freſh fracture do not ſhew a plain ſmooth ſurface under the microſcope, but appear ſometimes like grains of different magnitude, and at other time

times reſemble fine rays running in different directions, that do not correſpond with the internal ſtructure of the cryſtals, which I have endeavoured to examine in another place.

From what I have hitherto mentioned, the opinion that the baſalts have been produced by cryſtallization, becomes at leaſt leſs probable, whether we admit the wet or dry method. But I muſt not omit that the ſpars exhibit a kind of cryſtallization, which at firſt ſight reſembles a heap of baſalts; but, upon a cloſer examination, a very great difference is obſerved. The form of the ſpar is every where alike, but the baſalts differ from one another in point of ſize and number of ſides; the former, when broken, conſiſts of many ſmall unequal cubes, but the baſalt does not ſeparate in regular parts, &c.

Nature's ſecond method to produce regular forms is that of cruſting the outer ſurface of a melted maſs. By a ſudden refrigeration nature, to effect this purpoſe, makes uſe of polyedrous and irregular

forms. If we ſuppoſe a conſiderable bed, which is become fluid by fire, and ſpread over a plain, it evidently appears that the ſurface muſt firſt of all loſe the degree of heat requiſite for melting, and begin to congeal; but the cold requiſite for this purpoſe likewiſe contracts the uppermoſt congealed ſtratum into a narrower ſpace, and conſequently cauſes it to ſeparate from the remaining liquid maſs, as the ſide expoſed to the air is already too ſtiff to give way. In this manner a ſtratum is produced running in a parallel direction with the whole maſs, others ſtill are produced by the ſame cauſe, in proportion as the refrigeration penetrates deeper.

Hence we may, in my opinion, very plainly ſee how a bed may be divided into ſtrata. In the ſame manner the refrigeration advances on the ſides, and conſequently divides the ſtrata into polyedrous pieces of pillars, that can hardly ever be exactly ſquare, as the ſtrongeſt refrigeration into the inner parts of the maſs advances almoſt in a diagonal line from the cor-

ners. If we add to this, that a large maſs cannot be equal throughout its compoſition, nor every where liquid in the ſame degree, it will be eaſy to diſcover the cauſe of ſeveral irregularities. If the depth of the bed is very conſiderable, in proportion to its breadth, priſmatic pillars, without croſs-diviſions, are produced, at leaſt lengthways from the uppermoſt ſurface downwards.

The third way is perfectly ſimilar to the preceding in reſpect to the effect, but is different from it by the maſs being ſoaked with water, and by the burſting of it aſunder, which is the effect of the contraction whilſt it is drying. If we ſuppoſe ſuch a bed to be ſpread over a level ſpace, the drying advances in the ſame manner as the refrigeration in the former caſe.

This ſeparation into ſtrata properly happens when a conſiderable quantity of clay enters into the whole compoſition, becauſe the clay decreaſes more than any other kind of earth in drying.

We muſt now examine which of theſe two ways may beſt ſerve to explain the manner in which the baſalts are produced, for it is hardly poſſible that they ſhould have been formed by cryſtallization.

However well founded the opinion may appear of deducing them from a melted ſubſtance, ſeveral very conſiderable objections may nevertheleſs be raiſed againſt it, that I ſhall not forget to mention. It ſeems therefore more credible to me, that they have been produced out of their ſubſtance whilſt it was yet ſoft, or at leaſt not too hard to be ſoftened by exhalations. If we therefore ſuppoſe that a bed is ſpread over a place where a volcano begins to work, it is evident that a great quantity of the water, always preſent on theſe occaſions, is driven upwards in exhalations or vapours; theſe it is well known poſſeſs a penetrating ſoftening power, by means of which they alſo produce their firſt effect; but when they are increaſed to a ſufficient quantity, they force this tough moiſt ſubſtance up-

wards, which then gradually falls, and during this time burſts in the manner deſcribed above.

My reaſons for this opinion are theſe; firſt, we do not find the internal grain of the baſalts melted or vitrified, which however ſoon happens by fuſion, and for that purpoſe a very ſmall degree of fire only is requiſite. It conſequently is very hard to explain how this ſubſtance could have been ſo fluid, that no traces of bubbles appear in it (at leaſt I have not been able to diſcover any after the niceſt examination into the Scotch and Icelandic baſalts) and yet when broken appear dull and uneven. I know very well that lava is ſeldom vitrified within; but the great number of bubbles and pores which are found in the whole maſs, are more than ſufficient proofs than it has not been perfectly melted to its ſmalleſt parts, but has only been brought to be near fluid.

Secondly, the baſalts ſo much reſemble the more fine trapp, both in reſpect to their grain and original com-

compoſition, that they can hardly be diſtinguiſhed in ſmall fragments, as will be more plainly proved in the compariſon I hereafter make. See N° 24.

But the trapp in all probability has never been melted, at leaſt not in thoſe parts where I have had opportunities of examining it.

Almoſt in all the Weſt Gothia ſtratified mountains, the uppermoſt ſtratum is trapp; and it muſt be properly obſerved that it always lies upon black allum ſlate. Is it therefore credible that this ſubſtance, which in many places exceeds a hundred yards in depth, can have been perfectly melted without cauſing the ſlate lying beneath it to loſe ſome part of its blackneſs, even in thoſe places where they touch one another, as this effect may be produced in a ſmall culinary fire?

There is beſides a more fine kind of trapp, which is generally found in veins or loads, and frequently in very antient mountains, where not the leaſt traces of ſubterranean fire are to be ſeen.

The baſalt mountains ſeem to be very antient, at leaſt I do not know that the age of any one is aſcertained. Should they then be ſo old, that the ſubſtance of the trapp was not yet perfectly hardened, when were they produced? Beſides, we frequently find to this day clayey ſubſtances at a great depth, which are ſo ſoft that they may be ſcraped by the nail, but afterwards become very hard when expoſed to the air.

There have without doubt been many eruptions of fire on the iſle of Staffa, as the ſituation of the pillars and their being removed out of their places evidently prove.

You, Sir, have likewiſe brought a very clear proof of this from thence, which is a piece of baſalt, that exteriorly is full of hollows, and in a manner burnt.

A hard ſubſtance, when expoſed to a degree of heat inſufficient to melt the whole piece, may however be attacked by it in ſome parts of the ſurface moſt liable to become fluid.

The

The mixture of a large maſs is ſeldom every where ſo uniform, that ſome parts ſhould not be more liable to melt than others.

Crooked pillars may be produced as well by the drying as the refrigeration of a liquid maſs; for this purpoſe it is only neceſſary that the ſurface ſhould be bent, as the ſtratum always runs in a parallel direction with it.

From what I have hitherto ſaid you will perceive it is my opinion, that the baſalts have been produced by the aſſiſtance of a ſubterranean fire, but that it is not yet determined whether they have been ſeparated by the fuſion, or by drying: this laſt however appears more credible to me on account of the reaſons I have mentioned. For to ſpeak ſtrictly, the ſubſtances incloſed in the baſalts, though they ſhould even be volcanic, do not yet with certainty prove a preceding fuſion, as a ſubſtance ſoftened by water may be as proper for it as one fuſed by fire. I am however very far from being inclined to

maintain my opinion any farther than it agrees with certain experiments and obſervations.

Truth will ſooner or later be diſcovered; and I know nothing more derogatory to the honour of a natural hiſtorian, than having wilfully obſtructed its knowledge.

I will now give a more full deſcription of the baſalts and different kinds of trapp which you have brought from Staffa and Iceland.

24. Baſalt from Staffa.—The piece preſented to me is a priſmatic hexagonal fragment, three ſides of which are almoſt of equal dimenſions, and are connected with one another; two others are larger, and are ſeparated from one another by the ſixth and ſmalleſt; it is a little concave at the top, and convex at the bottom.

Trapp is generally found in ſquare irregular cubes, whence it has moſt probably obtained its denomination, on account of ſome ſimilarity with ſtones made uſe of for ſtair-caſes.

It is alſo found in priſmatic triangular forms, though rarely, as alſo in the form of immenſe pillars. Of this kind are thoſe called Traleſtenar, oppoſite Bragnum, at the foot of the Hunneberg, which have ſeparated themſelves from the remaining part of the bed; and in 1759, when I firſt ſaw them, formed an angle of about eight degrees with the plumb-line.

The baſalt from Staffa, when newly broken, is of a blackiſh grey, ſhining, and ſmall-ſcaled; and I have diſcovered with the microſcope ſome ſmall white particles ſprinkled up and down.

The fineſt trapp is perfectly ſimilar when broken, only of a lighter colour, which proceeds from the greater quantity of white particles.

The ſurface decompoſes into a grey-yellow looſe cruſt, that loſes itſelf in the more ſolid maſs.

The fine trapp decompoſes in the ſame manner.

The baſalt when ſtruck with the ſteel hardly gives fire, though a ſpark may

may now and then be obtained with difficulty.

This ſame circumſtance may be obſerved of the trapp.

Its ſpecific weight is about 3000, and that of the trapp about 2990.

It becomes fine by cutting, and poliſhing.

The more fine kind of trapp the ſame.

It yields an aſh-coloured powder.

The trapp yields rather a powder of a more light colour.

It ſoon melts to black glaſſy ſlags.

The trapp likewiſe.

The baſalt is attacked by ſal ſodæ with an effervеſcence that ſoon ceaſes, and though ſome ſeparation enſues, the greater part however remains undiſſolved. Borax perfectly ſolves it without effervеſcence, and gives a clear iron-coloured glaſs. It is ſolved with great difficulty by fuſible urinous ſalt, and whilſt cooling becomes of a whitiſh grey, and opake.

The ſame effects are produced by theſe acids upon the trapp.

One

One hundred parts of baſalt very finely powdered, and ſeveral times digeſted with freſh aqua regia, and then well waſhed and dried, leave ſixty-eight parts undiſſolved.

The remainder of this ſhews a little efferveſcence before it unites with the ſal ſodæ, and diſſolves very little. It is diſſolved with eaſe by borax, and with difficulty by fuſible urinous ſalt. It ſeems therefore to be a mixture of ſiliceous and gemmeous earth.

The ſolution gives by precipitation with lixivium ſanguinis as much Pruſſian blue as is equal to twenty-ſix parts in 100 of iron; though the baſalt, by being tried in the uſual manner in the crucible, does not yield above ten in 100. This proves that lixivium ſanguinis affords the moſt exact method of aſſaying iron ore.

When at laſt the ſolution is precipitated with cauſtic volatile alkali, after the iron has been ſeparated by lixivium ſanguinis, ſaturated with acid, pure argillaceous earth is obtained.

Some-

Sometimes a little calcareous earth appears after a preceding precipitation; when diſſolved ſal ſodæ is added; but ſometimes not the ſmalleſt traces of it can be diſcovered, even with the acid of ſugar, which is however the ſafeſt method hitherto known of diſcovering it. The calcareous earth ſeems therefore to be accidental. This is however very certain, that the interſtices between the pillars are ſometimes found filled up with calcareous ſpar.

The trapp is exactly of the ſame nature, and contains nearly the ſame allay, ſo that the experiments differ only one or a half part in one hundred. The moſt conſiderable difference conſiſts in the calcareous earth appearing here more viſibly, ſo that generally a ſlight effervescence is obſerved when an acid is poured on the powder.

25. Baſalt from Hvitara, near Skallholt, in Iceland.—The piece in my poſſeſſion is too ſmall to diſcover its form; only a part of the outſide can be diſtinguiſhed. When freſh broken

it reſembles the baſalt from Staffa, though ſomething may be obſerved in it which is very ſeldom diſcovered in the laſt. Theſe are ſmall round cavities, not larger than pins heads, thinly ſcattered in ſome places, as likewiſe on the outſide. All theſe cavities are filled up with a white, greeniſh, or brown powder.

May not theſe perhaps have been ſome particles of a ſubſtance, which eaſily diſſolving was become liquid, though the whole maſs had not a ſufficient degree of heat to melt it?

But whence can theſe cavities be filled with this powder? In the midſt of ſo ſolid a maſs, no decompoſition ſeems to be poſſible.

The ſubſtance of the baſalt itſelf produces a little effervescence with ſal ſodæ, and ſeparates without being viſibly diſſolved. It diſſolves in borax, as likewiſe in fuſible urinous ſalt, although with more difficulty. By the common method of proving it in the crucible it yields ten parts in one hundred of iron. The ſame circumſtances may be

be obſerved for trying the powder that fills up the cavities; it only ſeems to melt a little eaſier than the ſolid ſubſtance ſurrounding it.

26. The baſalt from Laugarnas perfectly reſembles coarſe trapp, though it has more white particles, and ſometimes cryſtallizations as large as a cherry-ſtone; the dark-grey and white parts prove to be entirely of the ſame nature by the blow-pipe, becomes fluid by itſelf, and produces a ſudden efferveſcence with ſal ſodæ, but without being quite diſſolved by it: it is exactly as the preceding ſort.

27. Black, ſolid gloſſy trapp, knotty within, and reſembling wood in its internal ſtructure, being full of fibres. Many pieces are grown to a cruſt of pumice on one ſide or another, though their edges are quite freſh and ſmooth; whence we may conclude, that they themſelves have not been melted, but have either been thrown into the lava, which was already burnt out, or that the lava has flowed over them: ſome part of it however ſeems to

to have been more attacked by the fire.

The manner in which the fire and acids operate upon this trapp, is exactly the ſame as with the preceding baſalt. There are likewiſe ſome grains ſcattered in it reſembling quarz, which are not ſolved by ſal ſodæ, nor does it cauſe any efferveſcence; borax and fuſible urinous ſalt entirely diſſolve them, though ſlowly.

28. A compact dark-brown trapp from Vido, the ſurface of which is glaſſy and uneven, as if it had been made fluid by fire. It muſt alſo be obſerved, that cryſtallizations of freſh pyrites are frequently found in theſe glaſſy rough pieces. The glaſſy ſubſtance eaſily becomes fluid with ſome ebullition, almoſt like ſhirl; beſides, it exhibits the ſame circumſtances with acids as the preceding.

You will ſee, Sir, by this long letter, that in the eruptions in Iceland argillaceous and ſiliceous ſubſtances have been principally concerned, as has been the caſe in other parts. I know very well that Mr. Beaumè main-

maintains, that ſilex might be made to afford allum with acid of vitriol after it has been diſſolved in liquor ſilicum with ſal ſodæ. But when the fuſions are made in veſſels which contain no argillaceous earth, no allum can be obtained with acid of vitriol, which however may be obtained when the vegetable alkali is kept fluid during a conſiderable time in a common crucible, becauſe the alkali diſſolves ſome part of the veſſel itſelf. Pure ſiliceous earth is intirely indiſſoluble by itſelf in acid of vitriol, let it be treated in any manner whatſoever.

Let this account of theſe dreadful devaſtations be ſufficient.

Homo naturæ miniſter & interpres, tantum facit & intelligit, quantum de naturæ ordine, re vel mente obſervaverit, nec amplius ſcit aut poteſt. *Baco.*

FINIS.